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Essays on the subnational government's indebtedness

La problemática del endeudamiento de las administraciones públicas territoriales

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Mar Delgado Téllez de Cepeda

Directores

Javier Pérez García
Gabriel Pérez Quirós

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Mar Delgado Téllez de Cepeda

Ph.D. dissertation

Supervisors:
Javier Pérez García
Gabriel Pérez Quirós
Banco de España

Department of Foundations of Economic Analysis II
(Quantitative economics)
Faculty of Economics and Business Administration
Universidad Complutense de Madrid
Campus de Somosaguas, 28223 Madrid (Spain)

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A mi padre, que me enseñó
a mirar desde distintas perspectivas,
a seguir luchando siempre por los sueños
y a valorar cada momento como único.

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"Nothing in life is to be feared,
it is only to be understood.
Now is the time to understand more
so we may fear less."

Marie Curie

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Introduction

"One thing I have learned in a long life:
That all our science, measured against reality,
is primitive and childlike and yet
it is the most precious thing we have."

Albert Eistein

This Ph.D. dissertation offers an extensive analysis of the Spanish Autonomous Communities (CCAAs, henceforth) indebtedness from complementary perspectives: debt evolution, deficit target non-compliance, commercial debt and debt market issues. CCAAs are the intermediate level of government in Spain, between the central and the local one, and they make for an interesting case to study for a number of reasons. First, Spain has a high level of fiscal decentralisation, and they are responsible for some of the largest and social-targeted spending items: health and education. Thus, Their proper functioning, stability and fiscal sustainability are essential for the well-being of the Spanish society. Second, they have gained significant political and fiscal autonomy over the past four decades through a process of decentralisation. This process has been asymmetric, with a different decentralisation speed for revenue and expenditure depending on the region, leading to both temporal and cross-sectional variations in both fiscal and political autonomy indicators. Third, they account for around a third of General Government debt increase from 2007 to 2017. Fourth, CCAAs, as a group, have been fairly active in the debt market until 2014. And finally, they have historically accumulated a significant amount of commercial debt.

CCAAs' debt became more relevant in the outburst of the European debt crisis, as the sustainability of some European countries debt was at stake. Spain was one of these countries that suffered a sudden increase in both public deficits and debt levels in all tiers of government. As a consequence, sovereign risk premium surged. Subnational debt added to the sustainability problem, as CCAAs struggled to face new funding needs generated by the accumulation of significant deficits. Soaring CCAAs' deficits and debt were accompanied by two additional concerns: first, the enlargement of commercial debt and the delay in payment of suppliers; second, the difficulties some CCAAs found to issue new debt in the markets at a reasonable cost.

This thesis aims at analysing fiscal sustainability of CCAAs. It does so by exploring four empirical questions that study several elements related to CCAAs' debt. These elements are individually studied in four chapters, although they are all part of a global vision of the CCAAs indebtedness matter. The four chapters are therefore closely related, they have their own internal structure as they intend to be free-standing (in the sense that each one can be read and understood independently). Chapter 1 addresses CCAAs' debt evolution and its determinants. Chapter 2 focuses on the analysis of the CCAAs' deficits targets noncompliance. Chapter 3 studies the macroeconomic impact of a facility established in 2012 targeting the subnational commercial debt. And finally, chapter 4 analyses the CCAAs primary debt market and issuance behaviour.[1]

Chapter 1 main purpose is to understand the evolution of the CCAAs' debt over the last two decades. Subnational debt has accounted for around 35% of the increase in Spain's public debt

[1]The first three chapters have been elaborated in collaboration with other authors: Javier J. Pérez, Pablo Hernández de Cos, Samuel Hurtado and Victor Lledó. The author of this thesis has been a leading actor in the research developed.

from 2007 to 2017, which reached a historical peak in 2014, surpassing the 100% of GDP threshold. Moreover, doubts about the capacity of some CCAAs to reimburse their debt has probably pushed upwards the sovereign risk premium of Spain. Thus, it is essential to comprehend the forces that move CCAAs' debt in order to prevent new episodes of rapid increases.

We estimate a panel Generalised method of moments (GMM) model to assess the impact on debt changes of economic, political, fiscal autonomy, debt structure and market discipline factors. We used annual data of debt over regional GDP from 1995 to 2017 for the seventeen CCAAs. Our main findings are the following: political factors played a limited role; Second, fiscal rules also played a limited role, being effective only in bad economic times and in high debt situations. Third, "the fiscal decentralization design", *i.e.* the distribution of revenues and expenditure competencies, is extremely relevant in keeping debt subdued. Fourth, market-disciple had some influence in regional public finances evolution. And fifth, commercial debt seems to have been used as a substitute for regular debt.

These results justify some basic political economy policy recommendations. Spain should reinforce the strict application of fiscal rules and increase the accountability of each tier of government. Encouraging co-responsibility for the subnational governments could help to tame debt increases, as voters would perceived subnational governments as final responsible of deficits. Controlling other alternative sources of indebtedness, such as commercial debt, is essential to avoid possible legal circumventions. Finally, there is room for increasing the role of market discipline. CCAAs have decreased their market activity since the 2011 maximum. Some CCAAs have even stop any kind of issuance activity. Nevertheless, with the gradual return to the market, the discipline coming from investors demands would probably discipline more the CCAAs' governments. Some of these factors are further developed in the following chapters: deficits, commercial debt and the role of debt markets.

Chapter 2 examines the determinants for CCAAs deficit targets noncompliance. It is based on the existence of a soft budget constraints, defined as the inability of subnational governments (SNGs) to keep fiscal deficit outcomes within targets, set as part of fiscal consolidation strategies at the general government level. Soft budget constraints have been shown to originate from the inability of central governments (CGs) to credibly commit to not bailing out SNGs.

This chapter tries to unify two literature branches. The first is based on the idea that soft budgets depend on political motives, *i.e.* election's proximity or the defence of government stability. They are aggravated by flawed intergovernmental fiscal institutions, including large vertical fiscal imbalances, weak fiscal rules, and limited market discipline. The second branch focuses on whether fiscal targets are appropriately established or if errors in forecasting may have entailed the fixation of unachievable targets.

We propose a conceptual framework that distinguishes the impact on fiscal noncompliance of soft budget constraints and of fiscal forecasting and target setting. The framework looks at both, the capacity and the incentives to comply. It differentiates events when SNGs have the capacity but not the incentives to comply with fiscal targets and when SNGs have the incentives

but not the capacity for fiscal compliance. Fiscal noncompliance is defined as voluntary under the former and involuntary under the latter.

Between 2010 and 2015, the aggregate of CCAAs have missed their fiscal targets systematically every year, constituting one of the main risks to Spain's ongoing fiscal consolidation process. Nonetheless, fiscal noncompliance, while widespread, varied significantly across regions in both frequency and margins. For the empirical analysis of the noncompliance determinants, we constructed a GMM model with annual data from 2003 to 2015. We divided the determinants in two categories: voluntary and involuntary noncompliance. The main results are as follows: First, non-compliant behaviour has some inertia; Second, from the voluntary side, noncompliance margin is higher if fiscal autonomy is lower, in electoral years, and whenever the parties ruling at a national and regional level coincide; And third, from the involuntary side, noncompliance will be more likely the more exigent the targets and the larger the forecast errors (difference between the forecast and the final GDP).

These results indicate that some institutional and procedural changes would be advisable to increase CCAAs compliance. The two main political implications are: First, improving fiscal institutions by increasing CCAAs fiscal co-responsibility would make CCAAs government more prone to comply, as they would be responsible for the fiscal misbehaving; Second, the involvement of CCAAs in the target fixation is key to ensure that CCAAs will consider the targets as their own.

Chapter 3 treats the matter of public commercial debt. The amount of commercial debt increased rapidly during the crisis. Total amount of consolidated Spanish general government payment obligations outstanding reached 8.1% of GDP from 5.3% in 2007. The Spanish government adopted several measures geared to reducing local and regional government trade debt volumes in 2012. Simultaneously, new regulations, aimed at structurally cutting down the payment delay, were approved. These policies have had a significant impact on the stock of trade debt and the average supplier payment period. Hence, the consolidated general government payment obligations outstanding in 2015 stood at 5.3% of GDP, significantly down on the 2011 figure.

These developments in general government trade credit in Spain may have exerted significant effects on economic activity. While deferred payment is a standard practice in trade relations, an excessive lengthening of the payment period may have harmful effects on creditor companies. In a time of financial constraint, these firms may not find alternative sources of financing or find them but at a high cost. Therefore, the trade debt-reducing measures implemented may have lessened financial constraints insofar as they entailed an injection of liquidity for households and firms. The aim of this chapter is to describe the extraordinary mechanisms for payments to suppliers developed in Spain in recent years and to quantify their impact.

The macroeconomic impact of the measures is assessed by two independent methods: a VAR model and the Banco de España Quarterly Macroeconometric Model. Both models conclude that the funds received by the suppliers had a significant impact on economic growth and employment

generation. Thus, the facility created by the central government solved the short term problem of non-payment to supplier. While in the long run, new laws have been implemented establishing higher control and transparency for commercial debt in all tiers of government.

Finally, in chapter 4 analyses the CCAAs' primary debt market. The interest of the subnational governments' securities have been a target of study mainly in the last decade, as economic crisis endangered the fiscal sustainability of lower tiers of government, and affected the general government credibility. Some central governments have evaded the existent bail-out clauses and have come to the rescue of troubled subnational governments, Spanish government among them. Nevertheless, until the creation of the Autonomous Liquidity Facility (FLA), a facility that the central government established to cope with the inability of the CCAAs to obtained new funding, the CCAAs used to rely only on securities and private loans. Analysing the functioning of CCAAs debt market is fundamental to ensure its proper functioning. It is crucial especially when considering that, as a result of the FLA, some CCAAs have exited the market and they would probably try to come back in the near future.

CCAAs behaviour towards the debt market has been very heterogeneous, regarding quantity issued, frequency and international presence. Some CCAAs have resorted to the market in the last decades to fund their financing needs, while others have relied more on bank loans. Andalusia, Catalonia and Valencia have stand out in the debt markets and have been responsible for the majority of debt issues since 1995. In this chapter, the analysis of the primary market is twofold: first, the factors that may affect securities' spreads; and second, the decision making of the CCAAs in terms of timing, quantity issued and term to maturity.

The analysis is built on all information available for all CCAAs securities issued from 1995 to 2017 and includes the information available at the moment of issuance for all indicators considered. I developed several empirical models to answer the main questions related with the issuance behaviour. First, I used an ordinary least squares (OLS) regression to study the possible determinants of spreads, considering the security characteristics and the economic and risk level indicators. Second, I divided the analysis of issuance decision in three different matters: the timing, the quantity issued and the term to maturity. In relation with the timing question, I estimated a non-linear probit model to analyse the factors relevant that may affect the probability of issuance. The two remaining questions are affected by a selection bias in the model because both decisions depend on the previous decision of the moment of issuance. In order to cope with this methodological problem, I estimated a Heckman selection sample model.

In the first stage of the analysis, spreads appear to be higher when the amount issued is larger, and the term to maturity is shorter. They also react upwards when sovereign risk and markets spreads rise, when economic situation of the CCAAs worsens and when the security is issued in a foreign currency. In the second step of analysis, the most interesting results with respect to the decision taking, is that CCAAs seem to optimise their issuance strategy, considering their financing needs, their economic situation, the behaviour of other competitors and the structure of their debt, whereas spreads appear to have a weak role. The lack of effect

of spreads over the issuance behaviour may indicate a sort of malfunctioning in the market due to bureaucratic rigidities that may exist. Nevertheless, the spreads data may also have some flaws that may distort the estimation results. Finally, the amounts received from the central government through the FLA have discourage the issuance of debt, and thus a debate is still pending about the role of this facility and the optimal moment for some CCAAs to return to the markets.

In conclusion, the recent economic crisis has triggered the debate of who is the ultimate responsible for the public debt. Both, the CCAA and the central government, must ensure that debt is sustainable: The CCAA as direct responsible for paying the debt, and the central government because, in the end, it may affect its cost of financing and, even, it may have to face the payment in the case of a possible bankruptcy. Better institutions, stronger control of deficits and an increase of co-responsibility are advisable. In the end, authorities from all levels must be responsible for their behaviour and face consequences for the bad management of public resources. A final recommendation from this thesis is that Spanish authorities should reach an agreement about the procedure to follow in case of future fiscal sustainability crises.

Chapter 1

Institutional and economic determinants of regional public debt in Spain

"I sincerely believe...
that the principle of spending money
to be paid by posterity
under the name of funding
is but swindling futurity on a large scale."

Thomas Jefferson

This chapter is based on Banco de España Occasional Document 1807 titled *"Institutional and Economic Determinants of Regional Public Debt in Spain"*, Delgado-Téllez and Pérez (2018)

1.1 Introduction

The analysis of sub-national public debt developments has gained relevance worldwide, due to the rising share of sub-national finance in the overall financing needs of the General Government sector in a number of countries, following a continued process of fiscal decentralization (see Canuto & Liu, 2010; EC, 2012). Against this framework, we study in this chapter the evolution and the determinants of Spanish regional governments' net financing needs (measured by the change in public debt). We estimate empirical models in which we exploit the pool structure of our data (17 regions over the period 1995-2017).

The Spanish case is a relevant one from a global point of view, given that in the last few decades a process took place in which a significant degree of fiscal devolution occurred, to heterogeneous regions, in parallel with the adoption of several national and supranational fiscal rules, in different waves. In this framework, in addition, Spanish regional governments have been traditionally very active in capital markets, have accumulated significant levels of public debt, and are a recent example of a situation of sub-central fiscal stress, including central government intervention, connected to the euro area sovereign debt crisis. We develop in the following paragraphs these elements.

First, regional public finances were one of the major sources of national fiscal stress during the recent economic and financial crisis. The lasting effect of the recent crisis over regional public finances entailed a strong surge of regional debt over the last ten years, from some 6% of GDP in 2007 to 25% in 2017. The "Comunidades Autónomas" (CCAA henceforth) faced significant fiscal stress during the core years of the crisis. As a result, financial markets were partially closed, and the central government decided to bail-out a majority of regions.[1] The CCAA debt crisis may have damaged the sovereign risk of the country as a whole, as clearly stated by rating agencies in the midst of the euro area sovereign debt crisis.[2]

Second, the degree of fiscal decentralization in Spain is significant, and commensurate to that of leading federal countries. A fast and steady decentralization process has taken place ever since the country became a democracy in the 1970's, entailing a progressive cession of some key expenditure and revenue items to regional governments.[3] The 17 regional governments currently manage, among other competencies, education (including universities), health and

[1] The central government reacted to these lack of liquidity of some CCAA creating two specific funds. The first one, the Fund for Suppliers Payments, targeted the commercial debt of the regions that grew strongly up to 2011 both in amount and in delay of payment. This Fund was key for enabling firms that provided services and goods to the Public Administration to stay open and to continue investing and hiring new workers (Delgado-Téllez et al., 2017). The second Fund, denominated the Financial Liquidity Fund, was established to cope with the liquidity problems of the CCAA. Both Funds entailed a change in the ownership of the CCAA debt, from the private sector to the central government. Thus, in 2017 around 58% of the debt of the CCAA was in hands of the central government.

[2] For example, as Fitch stated in its note *"Liquidity for Spain Regions Positive, More Detail Needed"* published on March 20th 2012, the relevant measure of debt for Spain was not the central government's one, but rather the total debt of the General Government that includes the regional and local debt.

[3] This decentralization process emanates from the current Spanish Constitution (voted in 1978) which, in its second article, recognizes the rights to self-government of "regions and nationalities", within the Spanish nation.

social services. In 2017, sub-national governments (CCAA plus municipalities) managed some 50% of total government expenditure, up from 35% in 1995 and a share below 20% in the early 1980s. In parallel to expenditure decentralization, there has also been a process of increased fiscal co-responsibility (fiscal autonomy).

Third, this decentralization process took place in a period in which a number of supra-national and national fiscal rules were implemented. National fiscal rules were implemented on top of EU-wide ones. Nowadays there are four main fiscal rules: deficit, debt and expenditure rules, similar to the European references, but subject to stricter monitoring procedures: In addition, another set of rules govern the accumulation of regional commercial debt, and spell a number of monitoring steps, including sanctions, in case payments are delayed with respect to legal periods. Despite these rules being in place, deficit non-compliance has been common at the regional level (Delgado-Téllez et al., 2016).

Four, Spanish regions have traditionally been very active in international regional bond markets, ranking only behind the US, Germany, Japan, China and Canada (see Canuto & Liu, 2013; Delgado & Pérez, 2018; Pérez & Prieto, 2015; Romeu, 2013). In 2017, total outstanding regional public debt amounted to some €288 billion (about 24.8% of Spanish GDP). For the whole period 1995-2017, average regional debt amounted to 11.1% of GDP, of which more than 40% was in the form of securities (other than shares). The weight of securities over total debt fell sharply during the economic crisis due to a partial closure of financial markets for the CCAA and the rising financing cost, reaching its lowest level of 16.2% in 2017.

Fifth, Spain's CCAA's fiscal credibility was also damaged over the past decade by the increase of liabilities not accounted for in the standard, European concept of public debt.[4] Those vehicles include the debt issued by companies controlled by regional governments and the accounts payable outstanding (including commercial debt). The literature suggest that these instruments may have been used by sub-national governments to circumvent the constraints on debt issuance they are subject to (and that only apply to conventional channels of financing) as some political economy arguments would suggest (see Fernández Llera and García Valiñas (2013)).

In this chapter we move beyond the available literature that analyses the role of fiscal federalism variables in the determination of regional public finances, the main difference being our focus on the determinants of the dynamics of public debt, rather than on primary balances as it is usually the case in the related literature. We deem changes in debt as our preferred object of study instead of budget balances given that the former is a broader measure of net financing needs and debt accumulation, and also because deficit-debt adjustments (stock-flow reconciliation) can be arbitrarily large, as in CCAAs in the period 2010-2013. In the latter respect, see Campos et al. (2006) for an international perspective on this issue. Some papers that precede

[4] *Excessive Deficit Procedure* debt (EDP). Public debt is defined in the Protocol No. 12 on the excessive deficit procedure annexed to the Treaty on the Functioning of the European Union as "[...] total gross debt at nominal value outstanding at the end of the year and consolidated between and within the sectors of general government". Article 1(3) of Council Regulation (EC) No 479/2009 specifies the definition of Maastricht debt and deficit in statistical terms including the treatment of trade credits.

in certain respects our work are Vallés Giménez (2002), that also includes an excellent survey of pre-2002 papers on the issue, Argimón and Hernández de Cos (2012), Simon-Cosano et al. (2013) or Mussons Olivella (2017), among others.[5] In addition, we explore a more up-to-date period of time and include a number of non-standard fundamental variables, in particular those related to the structure and composition of public debt, the definition of fiscal rules' variables, and the interaction of regional public enterprises' debt and commercial debt with regular public debt.

Among the set of determinants we pay special attention to: (i) institutional factors, such as fiscal decentralization and fiscal rules, including self-correcting mechanisms like the reaction to past debt and past deviations from targets; (ii) political factors, related with the electoral cycle and the composition of government; (iii) market-disciple indicators, such as the change in the implicit interest rate and the structure of debt itself; (iv) non-EDP debt, focusing on public corporations controlled by CCAA and regional commercial debt. We find that self-correcting mechanisms and market-induced discipline, and to a lesser extent deeper fiscal decentralization, have been associated in the sample under study with heightened fiscal discipline.

This chapter is organized as follows. In Section 1.2 we provide some stylized facts on regional public debt in Spain. In Section 1.3 we focus on two relevant institutional issues: the process of fiscal decentralization since the early 1980s and the evolution of fiscal rules affecting regional governments in Spain. Fiscal rules are are further expanded in Annex A. In turn, in Section 1.4 we perform the empirical analysis of the chapter, covering first the standard approach of papers on fiscal federalism, and moving next to a deeper look at the role of fiscal rules and market discipline indicators, to end up with some results on the link between regional governments' standard debt and other public debt concepts. Finally, in Section 1.5 we provide some conclusions.

1.2 Stylized facts on regional public debt

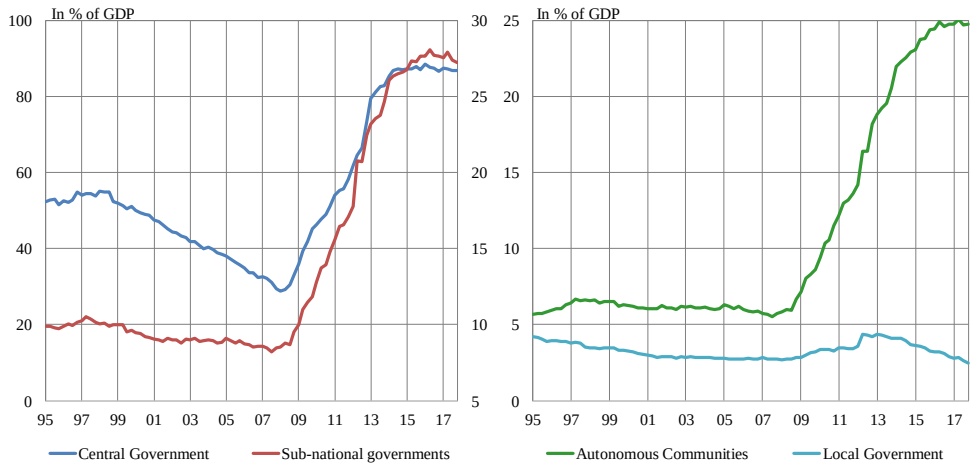
1.2.1 Some trends

Spanish General Government debt increased in the period 2007-2017 by nearly 63 points of GDP. As can be seen in Figure 1.1, the increase in debt was visible in all the subsectors of the General Government. In particular, central government and CCAA non-consolidated debt moved from 29.5 and 5.7 percent of GDP, respectively, at the end of 2007, to 86.9% and 24.8% of GDP in 2017, multiplying by 3 and 4 their amounts respectively.

The increase in public debt came hand-in-hand with increases in other liabilities not covered by the extant definition of debt, but that are close complements, namely the aggregates of public corporations' debt and other accounts payable. The statistical category "*other accounts*

[5]The institutional determinants of local governments' indebtedness have been more widely analysed in the literature, mainly from a less aggregated-macro perspective than the standard in papers looking at the determinants of CCAAs' debt. See for example Cabasés et al. (2007) or Bastida et al. (2013), and the references quoted therein.

Figure 1.1: The evolution of public debt in Spain, by subsector.



SOURCE: Banco de España

payable" consists of financial claims which are created as a counterpart of a financial or a non-financial transaction in cases where there is a timing difference between this transaction and the corresponding payment. This category includes transactions in financial claims which stem from the early or late payment for transactions in goods or services, distributive transactions or secondary trade in financial assets. They consist of the counterpart transactions in case payment is due and not yet paid. Debts arising from income accruing over time and arrears are also classified under this category. This is clear from Figure 1.2. Regional public corporations' debt increased up to 2010 and decreased afterwards, being the difference between the maximum and minimum over the whole period less than one percentage points of GDP. Meanwhile, the"*other accounts payable*" increased steeply up to the end of 2011 beginning of 2012, to decreased then sharply up to 2017. Nevertheless, its level is still higher than the pre-crisis one.

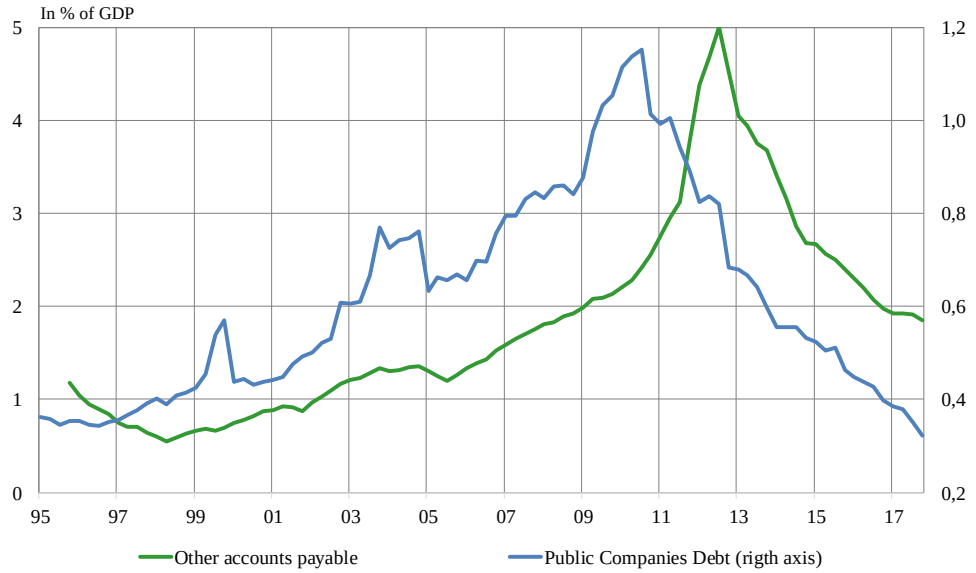
1.2.2 A standard decomposition of debt changes

It is worth looking at the evolution of debt in the period under scrutiny through the lens of the government budget constraint. Let Y_t be nominal GDP at t and let D_t be the nominal value of government debt. The government budget constraint accounts for how a nominal interest rate i_t, net inflation π_t, net growth in real GDP, gdp_t, the net-of-interest deficit as a percent of GDP, def_t, and the deficit-debt adjustment, DDA_t combine to determine the evolution of the government debt-to-GDP-ratio,

$$\frac{D_t}{Y_t} = \frac{1+i_t}{(1+\pi_t)\,(gdp_t)}\frac{D_{t-1}}{Y_{t-1}} + def_t + \frac{DDA_t}{Y_t} \tag{1.1}$$

were the nominal yield i_t and the real stock of debt D_t are averages of pertinent objects across terms to maturity. Its linearized version, suitable for accounting decomposition of the funda-

Figure 1.2: Other Autonomous Communities' (regional governments) liabilities not included in the standard definition of public debt.



SOURCE: Banco de España

mental determinants of debt, takes the standard form

$$\frac{D_t}{Y_t} = (i_t - \pi_t - gdp_t)\frac{D_{t-1}}{Y_{t-1}} + \frac{D_{t-1}}{Y_{t-1}} + def_t + \frac{DDA_t}{Y_t} \tag{1.2}$$

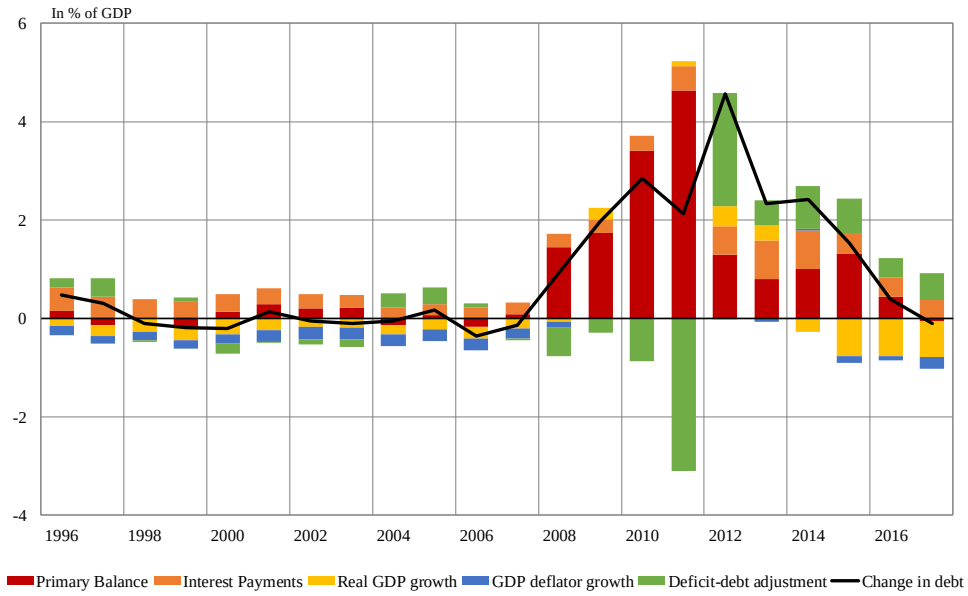
With this decomposition at hand it is possible to analyse the determinants of changes in the debt-to-GDP ratio. In Figure 1.3 we decompose these determinants for each year over the period 1996-2017 for the aggregate of CCAA (see 1.4 for the evolution of individual CCAA's debt). CCAAs reduced marginally their stock of debt in the period till 2007, with positive factors (real GDP growth and inflation) broadly compensating the debt-increasing effect of interest payments and, to a much lesser extent, primary deficits. With the burst of the most recent crisis, though, the latter equilibrium was broken and a significant contribution of public deficits pushed public debt upwards. Deficit-debt adjustments (stock-flow reconciliation) exerted a significant impact, in particular over the period 2010-2013.

1.3 Institutional Framework

1.3.1 The process of fiscal decentralization in Spain

Spain is currently one of the most decentralized countries in the European Union. As mentioned before, in 2017, 50% of general government expenditure was carried out by subnational governments, with about 36% and 14% in the hands of regional governments and local governments, respectively (see Figure 1.5, second panel). This was the outcome of a gradual transfer of responsibilities for the management of specific services from the central government to the

Figure 1.3: The determinants of changes in Regional Governments' debt (changes as a percent of GDP) in the period 1995-2017.



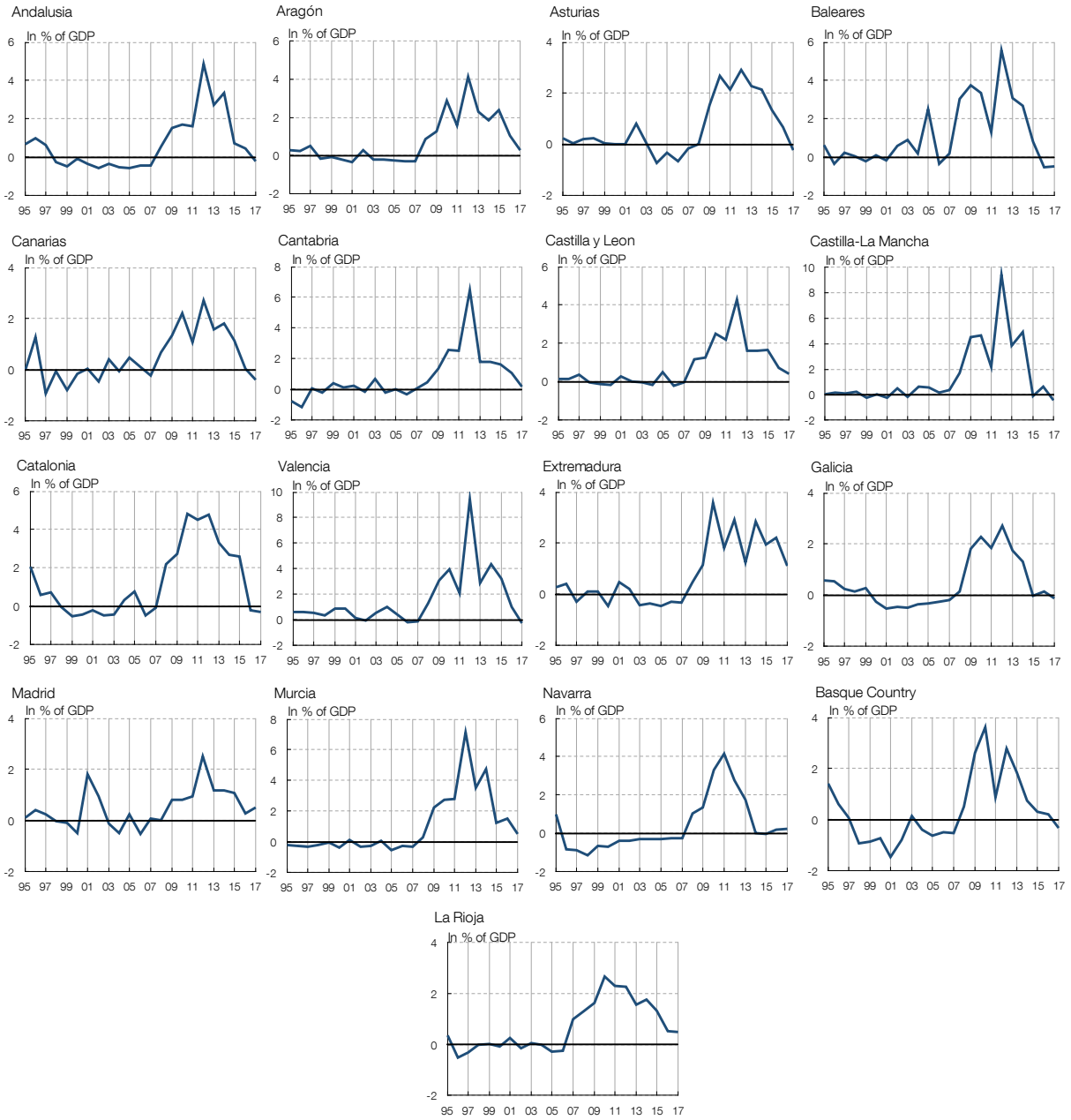
SOURCE: Banco de España; Ministry of Finance.

CCAAs since the beginning of the 1980s. In particular, CCAAs were responsible for 92% of public expenditure on healthcare and 91% in education in 2016, and they managed a significant part of other expenditure functions.

The transfer of expenditure responsibilities from the central government to the CCAAs has, however, neither come about at the same pace, nor have they been on the same scale in all CCAAs. The main differences concern the time at which the various CCAAs took over education and health competencies. On the one hand, the regions that gained autonomy through article 143 of the Spanish Constitution did not assume the respective management of educational and health services until the 1990s and early twenty-first century. On the other, Andalusia, the Canary Islands, Catalonia, Galicia and the Valencia Community, along with the Basque Country and Navarre, namely the regions that gained autonomy through article 151 of the Constitution and those with their own specific status due to their historical jurisdiction (the so-called "Régimen Foral"), assumed health and education responsibilities practically from the beginning of the 1980s.

In parallel to this process of devolution of expenditure responsibilities to the regions, a financing system for the subnational governments was also progressively developed (see Figure 1.5, first panel, on the extent of revenue decentralization). Again, the process was not completely homogeneous across regions. In particular, a distinction should be drawn between the ordinary-regime CCAAs (all except the Basque Country and Navarre), with partial fiscal autonomy, and the specific-status CCAAs (the Basque Country and Navarre), which have full fiscal autonomy with the exception of customs tariffs.

Figure 1.4: Autonomous Communities' (regional governments) debt evolution in the period 1995-2017: changes as a percent of GDP.



SOURCE: Banco de España.

In essence, the Basque country provincial authorities (Álava, Guipúzcoa y Vizcaya) and Navarre's regional government have the power to maintain, establish and regulate, inside their territory, the tax regime, taking into account some coordinating provisions established with the central government, which basically imply that the effective overall tax burden arising from their regulatory power must not be lower than the existing in the rest of the country. Accordingly, they are responsible for collecting all taxes except those included in Customs Revenue and those raised through Fiscal Monopolies. As a consequence of the fact that the taxes collected by these

regions include almost all those existing, while at the same time the central government provides some services in these regions (defence, diplomatic representation, etc.), the Basque Country and Navarre transfer some of their resources to the centre, by means of the so-called "Cupo", in order to contribute to the financing of these services.

The financing arrangements for the ordinary-regime CCAAs have been developed over time on the basis of five-year agreements. In this regard, the so called Fiscal and Financial Policy Council (*Consejo de Política Fiscal y Financiera*, CPFF, hereafter) played a key role. The Council is composed of the nation-wide ministers of Economy and Finance and of the CCAA ministers of Finance, and acts as a consultative and discussion body with wide-ranging tasks relating to the co-ordination of the CCAAs financial activity. The agreements reached within the CPFF form the basis for developing the CCAAs financing arrangements.

1.3.2 The fiscal rules framework

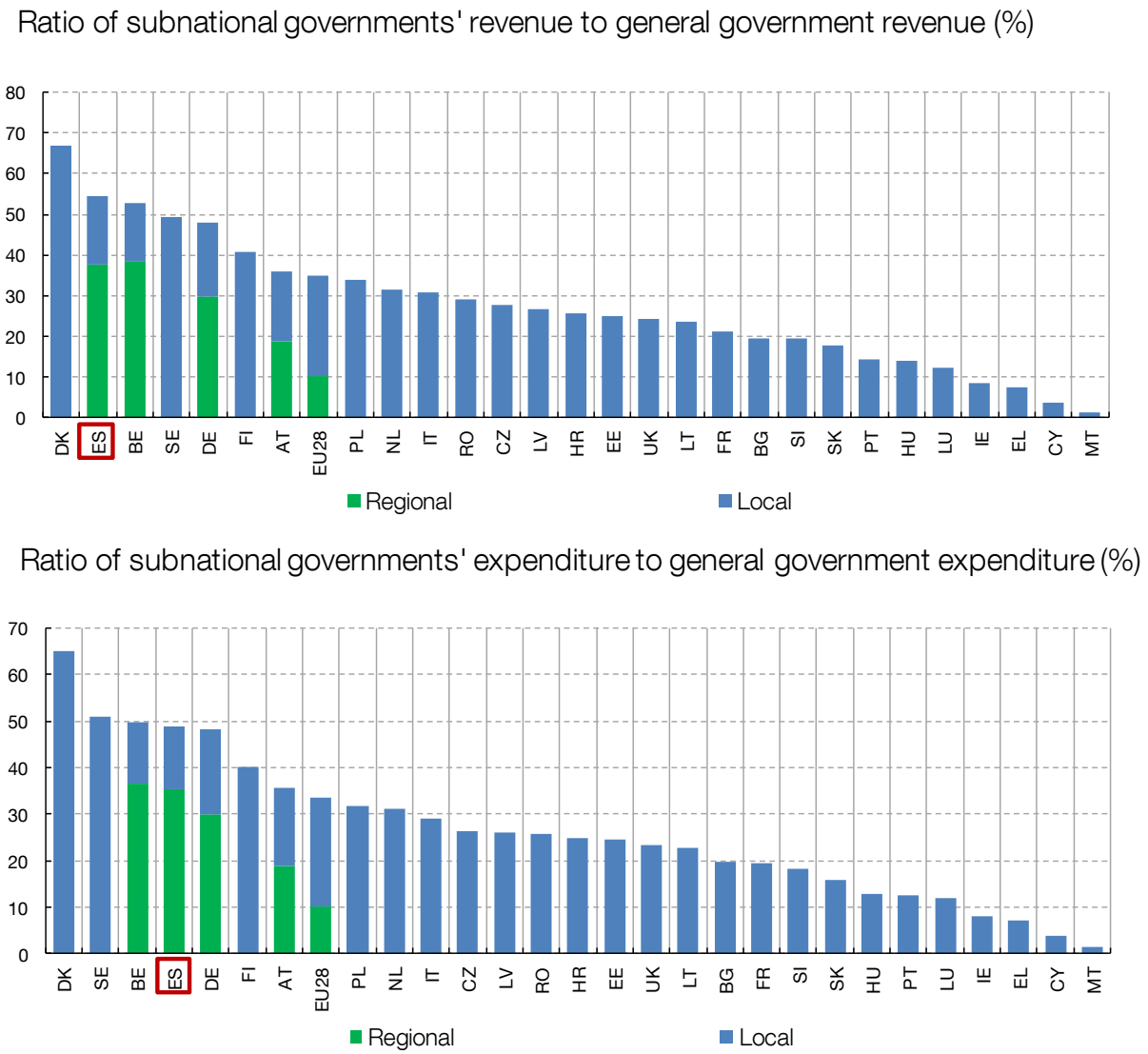
From the outset of the introduction of the modern welfare state in Spain, subnational governments were subject to some constraints and limitations on their capacity to borrow and/or generate budget deficits. In the case of the CCAAs, they were empowered to take on debt, albeit subject to certain limits. Specifically, credit operations at less than one year were to be used to cover temporary treasury requirements, while credit operations at over one year, should meet the following requirements: (i) that the total amount of the credit is earmarked for financing investment spending; and (ii) that the annual amount of debt repayments plus interest does not exceed twenty five percent of the CCAAs' current revenues. For the arrangement of credit operations abroad and for debt issuance and any other resort to public credit, the CCAAs require the authorization of the central government.

CCAAs' credit operations should be coordinated among the CCAAs themselves and in keeping with the central government's debt policy, with the CCAAs obliged to submit an annual debt programme to the central government. Once the programme has been agreed, it entails the automatic authorization of all the operations contained therein. The application of the programme may be changed by a region following a new proposal to the government. Further, the central government itself may suspend the programme on a precautionary basis should there be exceptional circumstances that might hamper the Treasury's financial policy or involve imbalances in the relationship between the level of external and domestic debt. For more details on national fiscal rules of application to the conduction of CCAAs budgetary policies, see Annex A.

1.4 Empirical analysis

In this section we move to the study of the determinants of the evolution of regional public debt, measured its change in terms of regional GDP. We do so by estimating empirical models in which we exploit the pool structure of our data: 17 regions over the period 1995-2017. The analysis we exploit the rich structure of institutional changes that happened over that long time

Figure 1.5: International comparison of sub-national governments' revenues and expenditures (2017).



SOURCE: EUROSTAT
a. Country nomenclature following ISO 3166/2

span[6] to pose testable hypothesis on the impact of fiscal decentralization and fiscal rules. In addition, we include in the analysis political economy and market-disciple indicators.

1.4.1 Data and hypotheses to be tested

In line with the extant literature, we include diverse channels that may affect the evolution of debt such as economic, political and institutional factors. Table 1.1 represents the main channels, and the variables used to test the main theoretical hypotheses. Apart from the common variables used in the literature, we also include a number of less conventional variables linked

[6]The time period for the empirical analysis is selected due to data availability constraints.

to the structure of public debt and market disciple measurement.

Table 1.1: Variables and expected impact on debt changes.

	Channels	Expected impact
Economic factors	Economic Cycle (t-1)	-
	Inflation deviation	-
	GDP per capita deviation	+/-
	House inflation deviation	-
Fiscal Rules	Fiscal Rules	-
	FR x Economic growth deviation	+
	FR x Budgetary Balance deviation	+/-
	FR x Debt/GDP (t-1) deviation	-
Institutional factors	Revenue autonomy	-
	Vertical Fiscal Imbalances	+
	Health expenditure	+/-
	Education expenditure	+/-
	Investment expenditure	+/-
Political factors	Electoral date distance	-
	Concordance	+/-
	% Left-wing MPs	+/-
	% Regionalist MPs	+/-
Market Discipline	Rating (t-1)	+
	Short/long term debt	+/-
	Securites/Loans debt	-
	Non-resident/resident debt	-
	Implicit interest	-
	Issuance interest	-
	Budget compliance (t-1)	-/+
Non-EDP debt	Fund for suppliers' payments	+
	Public companies debt	+
	Commercial debt	+

Economic variables used as controls As regards the economic factors, we follow closely the definitions and variables of Argimón and Hernández de Cos (2012). Economic theory has highlighted the economic cycle as a fundamental determinant of budget balances and, as a consequence, of changes in public debt. We use budget compliance over GDP to understand the effect of deficits on the debt accumulation.[7] In economic downturns budget deficits increase, either through the operation of automatic stabilizers or through the impact of counter-cyclical discretionary fiscal policies designed to stabilize the economy, while the opposite occurs in expansions.[8] In addition to this channel, economic growth erodes the stock of public debt when measured as a percent of GDP. Indeed, even high debt ratios can be sustainable in a framework

[7] We measure the budget compliance as the difference between the actual budget in cash terms and the initial budget. Thus a positive value would entail compliance.

[8] Some authors point out, however, that the higher revenues in economic boom periods may generally entail pressure on the growth of public spending, in such a way that the relationship between the economic cycle and the budget balance may be altered or, at least, evidence asymmetrical behaviour over the course of the cycle. See Morris and Schuknecht (2007), on related grounds.

of healthy economic growth, while in a situation of low or negative growth even low debt ratios can turn out to be non-sustainable. We include in our analysis the lag of yearly real growth rate of each CCAA (variable *Economic cycle*), taken from the Annual Regional Accounts published by the Spanish Statistical Office (INE).

Among the set of economic factors, we also include the deviation from the regional average of GDP per capita as control variable as a measure of the degree of economic development,[9] but the relation with the debt evolution is not straight-forward. *Ceteris paribus*, a richer CCAA would have more margin of manoeuvre to cope with a debt surge, while at the same time because of the larger resources it may find it easier to obtain private financing at a lower cost, encouraging it to increase its debt more. In general, at a country level experiences very diverse experience, having some of the richest countries with enormous amounts of debt, such a Japan.

Another relevant economic factor behind debt accumulation may be the evolution of prices, as prescribed by the government budget constraint. Here the literature usually emphasizes the role of asset prices that may affect fiscal outcomes basically through the tax system (taxes on capital gains and losses, taxes on transaction, and tax relief, in particular, in the Spanish case, for house purchases). In the case of Spain, financial and non-financial assets form the basis of certain taxes managed and collected by CCAAs. Available information for variables that could capture asset prices at the regional level is scarce. Because of its relevance in the boom period (1995-2007) and its availability, housing prices might be a good proxy to capture the incidence of assets on regional public finances. We define a variable as follows: deviation of the change in each region's index of housing prices with respect to the national mean.

More generally, overall inflation is a factor that is typically considered as key in the debt ratio determination although it may exercise opposing forces over the debt accumulation. On one hand, the indirect effect the inflation may have over the tax revenues (depending on the degree of wage indexation) and the direct through its deflating effect on the debt-to-GDP ratio may be compensated by the increase of expenditures that are indexed to price evolution. [10] The incidence of price changes (measured by the changes in the CPI) will be captured by a variable defined as the deviation of each region's inflation in relation with the national mean, in such a way that possible common trends are taken care of.

Fiscal Rules Fiscal rules in Spain have increased in variety and strength over the past decades. Therefore, it is vital to clarify whether the rules have been effective or not. In order to do so, we consider the measure of the strength of fiscal rules developed by the European Commission,

[9] This deviation is measured as the GDPpc divided by the average GDPpc multiplied by 100.

[10] Apart from the impact on nominal GDP (the denominator of the debt ratio), higher inflation may increase the budget deficit through higher nominal interest rates and a higher real cost of purchases of goods and services or investment and, in general, of those items of public spending that can be indexed (*e.g.*, pensions and wages). In the presence of non-indexed taxes, inflation may also generate higher revenues if, for instance, the tax rates are progressive. See Hernández de Cos et al. (2016).

the so called Fiscal Rules Index, that is available for the whole period of study.[11] Public debt developments may be affected by the presence of different types of fiscal rules insofar as they supposedly pose a permanent constraint on fiscal policy. In addition to their role in enhancing fiscal discipline, such fiscal rules may further contribute to the reduction of uncertainty about future fiscal policy developments (see Plekhanov, 2005)[, for a discussion of rules-based controls on regional governments' borrowing compared to other alternatives]. One of the main hypothesis that we intend to contrast is whether fiscal rules have subdued the surge of regional debt, *i.e.* if the rules have had the expected dissuasive effect. Thus, if fiscal rules are effective, we would expect that an increase in strength of rules will entail a moderation of the upward evolution of the debt. We also include the interaction of this index with three variables: lagged economic growth, the lag of the deviation of budget balances with respect to the average for all CCAA, and the lag of the deviation of the debt-to-GDP ratio to the average.[12] The main idea is to test whether fiscal rules are more effective depending on the economic situation of the CCAA.

Thus, while there are no previous insights about the effectiveness of fiscal rules when economic growth is higher or smaller, it is plausible to think that if a CCAA has a stronger growth, the central government would be more stringer in the application of rules in this case, and thus rules would be more effective. Therefore, we would expect a negative impact for the interacted variable. A similar reasoning may be applied to the other interacted variables. If the budget balance ratio is worse for a CCAA in t-1, *i.e.* it has a higher deficit or a smaller surplus, fiscal rules would be effective if in the current year the debt does not grow as much. This would mean that the rules are effective for those CCAA with less sound finances. In the case of the debt interaction variable, when a CCAA has a higher debt the fiscal rules would be effective if the impact is negative, meaning that the higher the debt, the less would grow the debt on the following period. It may be noted that in previous studies, such as Argimón and Hernández de Cos (2012) and Delgado-Téllez et al. (2016), fiscal rules do not seem to be very effective in deterring the deficit non-compliance. Therefore, we would not expect a high effectiveness of fiscal rules in controlling debt evolution.

Political and institutional factors The literature has proven the necessity of including political and institutional factors in the standard analysis (typically focused on the study of budget balances) to explain the persistence of budget deficits and the accumulation of debt in advanced economies. In our analysis we include a number of political variables: (i) ideology, measured, first, by the percentage of left-wing MPs over the total seats of regional parliaments, and second, by the percent of regionalist parties' MPs (parties that only operate in a given region, and do not form part explicitly or implicitly, of a national party) over the total number of seats

[11] See https://ec.europa.eu/info/publications/fiscal-rules-database_en. The new index is a normalized one, with an starting value of -0.45 to an ending value of 2.27. We have rescaled the variable so that there are no negative values that could hinder the estimation sign interpretation

[12] Budgetary Balances are obtained from the National Accounts (NA) data published by the Finance Ministry. Because data is only available at an annual basis from 2000 onwards, the beginning of the sample is completed using the public accounts' budgetary data (cash-based). This strategy will be used for all series. We use the lag of the Budget Balance over GDP to prevent any endogeneity possible in the analysis.

of the regional parliament; the first variable aims at capturing potential pro-spending biases depending on the ideological orientation of the regional government, while the second could be instrumental for testing the existence of different attitudes towards public debt accumulation depending on the scope of the objective function of the regional government; in both cases there are no specific assumptions; (ii) a dummy for the political concordance of the center and the periphery (region), that measures the political alignment between the government of a given region and the central government; (iii) electoral cycle: instead of the standard election dummy that display a value of one in an election year and a zero otherwise, we use a transformation of the original variable to measure proximity to elections, computed as a continuous variable as the distance to elections (see Franzese Jr, 2002; Franzese, 2000; Mink & de Haan, 2005).[13] This variable takes the value of one in the electoral year, and in the next period it would take 1/number of years left until next election, and so on[14]. There are two possible expectations about the impact of the electoral cycle. First, the year after elections, governments may start new investment projects, with the intention of finishing them before the next electoral date. Thus, debt would increase the most in the first years of the electoral cycle. But, on the other hand, expenditure tends to increase the near the electoral date is. Thus it would imply a surge of debt to finance the extra-expenditure.

Fiscal federalism-related control variables The territorial organization of a country has also been signaled by the extant literature as a further determinant of the fiscal situation, either measured by the fiscal balance or by the stock of debt. In particular, the responsibilities assumed by the regions, the instruments for financing them, and the relationships between regional and central governments are all factors that certainly affect the aggregate fiscal outcomes of a given country and, more specifically, the distribution of fiscal outcomes among the different layers of government. In particular, the literature has devoted some effort to the existence of a so-called *soft budget constraint problem* whereby a regional government may have incentives to conduct an undisciplined fiscal policy under the expectation that the central government will intervene in case of trouble (see Delgado-Téllez et al., 2016; Kornai et al., 2003; Qian & Roland, 1998; Sorribas-Navarro, 2012).

Following the literature we include in our analysis some alternative measures of fiscal co-responsibility, measured by: (i) Tax autonomy, the ratio of taxes over which the regions do have normative power, over their total non-financial revenues in NA terms;[15] (ii) The ratios of expenditure on education and health over regional GDP that represent the evolution of expenditure decentralization over the last 22 years.[16] Also the ratio of investment over total expenditure is used as a proxy of voluntary spending. (iii) Vertical Fiscal imbalances which is proxied following

[13] On electoral cycles and budgetary outcomes see, for example, Von Hagen (2010) or Mink and de Haan (2005).

[14] Thus, if there are 4 years between elections, the variable would take 0.25, 0.5, 0.75 and 1

[15] The period 1995-1999 is obtained as a linear extrapolation with the execution data, as the NA accounts only cover the period 2000-2017. All NA data comes from the General Intervention Board of the State Administration website

[16] Yearly disaggregated data is available separately the COFOG publication available at the Finance Ministry, being 2016 the last year available.

Eyraud and Lusinyan (2013) by the difference of total revenues and total expenditure, both net of transfers with the other subsectors of public administration. The literature argues that there should be correspondence between the extent of a given region's spending responsibilities and its fiscal autonomy (fiscal co-responsibility), the latter being understood as the ability of the regions to generate income to finance that spending. Otherwise, vertical fiscal imbalances could emerge in the regions that would be usually filled by federal transfers. These transfers distort the relationship that should exist between the level of taxes and the benefits obtained by citizens, creating a common pool problem. As regards the impact of own revenue decentralization on fiscal balances, Governatori, Yim, et al. (2012) discuss that theory does not provide clear predictions. On the one hand, a high value of a tax autonomy means that regional governments have more own resources to cover a given amount of expenditures, leading to better fiscal balances. On the other hand, one has to acknowledge that this type of variable conveys no information on the relative size of regional own revenues compared to their expenditures, which is probably a better way to capture regional governments incentives to behave in a financially responsible way. In addition, the impact of revenue decentralization may also differ depending on the share of transfers/taxes in CCAAs' revenues.

Market discipline, structure of debt Beyond the factors analysed in the previous paragraphs, the ability to increase debt by a given level of administration is fully determined by its ability to raise the necessary funds. In addition to increasing taxes or decreasing expenditure, the CCAA need external financing (national or international). Thus, either investors buy the debt of a CCAA or banks grant loans to the regions. One may conjecture that market pressure might be a key determinant on the change in public debt. The case of Spain is not one in which there is full reliance on capital markets to contain sub-national borrowing, as in the cases of Canada, Switzerland, and the United States. The latter are cases in which the central government does not set any limits on regional government's borrowing, so that these levels of government are free to decide the form of borrowing, and may decide by themselves to adopt a fiscal rule in an attempt to enhance their credit standing in the market.[17] Before 2012, in the Spanish framework regional governments were constrained by upper-level rules, as described above, while at the same time were subject to strict market scrutiny. But, the introduction of the FLA implied a change in the legal framework, imposing to those CCAA that decided to enter the financing program a reinforced conditionality due to the factual loss of the market discipline, as CCAA stopped depending on investors to finance their needs.

To approach the influence of market discipline, we explore the following control variables: (i) the implicit interest rate, as a measure of the market pressure [18]; (ii) the aggregate average issuance cost rate is used, but taking into account a caveat, and that is that some CCAA do not generally access to markets for getting financing for their debt. But it is a fair proxy for the

[17] In Switzerland, after an episode of soaring debt over the 90's, the Government introduced a debt brake rule, which is a highly strict rule, according to which the deficit of one year must be compensated in the next years, as explained by Bodmer (2006).

[18] Measured as the ratio of interest payments over the stock of debt

market distress CCAA may have to confront when they need market financing; (iii) a number of variables linked to the composition of debt, as follows. First, the ratings in last period may impact the debt evolution, because the lower the ratings the harder should be to issue new debt. Second, the ratio of short-to-long run debt, being short term debt the one with a maturity less or equal to 12 months. Short-term debt could be associated with the reaction to sudden changes in market sentiment. Thus, it is not always a negative indicator, because a Government may expect a reduction of interest in the near future, and therefore it would prefer short term debt until costs decrease.[19] In a framework of worsened perception about a given sovereign, though, increased reliance on short-term debt can lead to a heightened vulnerabilities, as worsening perceptions of a given region's creditworthiness can quickly feed into higher interest costs. Third, the ratio of securities to loans, with the prior in mind that loans could be more easily obtained in somewhat "captive" markets vs. open competition to capture investors in securities. In the particular case of the regions of Spain, regional savings banks ("Cajas de ahorros") typically assumed a role as CCAAs bankers. And finally, the ratio of debt held by non-resident vs. that held by residents, might be also a measure of stress in the markets as, a priori, in the case of undisciplined governments that are perceived as pursuing unsustainable fiscal policies, non-residents tend to react more quickly and shift portfolios towards more secure assets than residents.

Additional control variables: pressure from units accounted for outside the boundaries of the General Government sector In particular, we consider the two non-EDP debt measures described in Section 1.2: the debt of public corporations owned by a given region, and the "other accounts payable". Indeed, the related literature would suggest that: (i) under tight budgetary rules a government may try to circumvent the constraints by cutting transfers to public corporations that, in turn, can finance the same spending by issuing debt that is not computed by means of the same accounting standards used to define the rule (typically as in National Accounts); (ii) an excessive level of non-standard debt may end up generating pressure on the responsible government to bail-out the external indebtedness vehicle.[20] (iii) The commercial debt may be used as a buffer in time of crisis, encouraging governments to delay payments to their suppliers, as it actually occurred in Spain up to 2011. We also include an informed dummy of the FFPP payments in percentage of GDP. This includes all the payments of the suppliers of the CCAA made by the central government funds.

1.4.2 The empirical model

The incidence of the different determinants on the changes in public debt mentioned in the previous section will be tested by means of a standard econometric model that can be specified in quite general terms as:

[19] Some papers have found short-term debt to be an indicator of vulnerability to international financial crises: Borensztein et al. (2004),Rodrik and Velasco (1999), Bussière and Mulder (1999).

[20] On a discussion about the role of public sector enterprises in Spain see Fernández Llera and García Valiñas (2013).

$$\Delta \frac{D_{it}}{Y_{it}} = \alpha_i + \sum_{j=1}^{N} \beta_j \ \Omega_{jit} + \epsilon_{it} \tag{1.3}$$

Under the proposed approach, the change in public debt of each regional government,i, at time t, $\Delta \frac{D_{it}}{Y_{it}}$, depends on a set of control variables, Ω, encompassing the economic, political, institutional, market-induced and non-EDP factors mentioned above. Following the traditional fixed-effects model, α_i in equation (1.3) aims at capturing all the unobservable CCAA effects that are time-unvarying, while ϵ_{it} is an error term assumed to be white noise. As for the estimation method, and in order to avoid any biases stemming from the possible correlation between the individual effects and the regressors, we estimate model (1.3) in first differences. Moreover, given the possible simultaneity of some of the control variables and the dependent variable, the estimation is carried out by the Generalized Method of Moments (Arellano & Bond, 1991), using as instruments lagged regressors.

For robustness, we also estimate a fix effect model that is not estimated in inter-temporal differences. Thus we don't include the lag of the dependent variable in this estimation. It includes a fix effect for CCAA. Main results do no differ between both kinds of models. We have chosen the fix effect instead of the random effect model following the Hausman test criteria results, otherwise we would have estimated a random effect model.

1.4.3 Results

The results are shown in tables 1.2, 1.3, 1.4 and 1.5. The two first result tables include two different samples, the whole sample (1995-2017) and a sample without the recent crisis period (1995-2007) for the sake of robustness, as well as the Fix Effect models estimation.

In Table 1.2 we explore the role of the main economic variables and of the fiscal rules. In Table 1.3 we focus on studying the institutional and political factors. The effect of the different measures related with the market discipline is shown in Table 1.4, while in Table 1.5 we consider the impact of the debt (non-EDP) of public corporations and other accounts payable on the CCAA's debt.

Beginning with the baseline model shown in Table 1.2, there are six models included in this table. The first two columns show the GMM model whole sample, the second two the GMM model with a restricted sample from 1995 to 2007, and finally the last two columns show the fix effect model for the whole sample. The dependent variable is the change in the ratio of debt over GDP. The first conclusion we may draw from the results is that CCAA debt does not seem to follow an explosive path as both the lagged variable and the lag level of debt show a negative impact on the change of debt that in the case of the level of debt is highly significant. This means that whenever the level of debt or the change in debt increases in the previous year, the change in debt will be subdued in the current one. This is probably due to a combination of factors, first, if CCAA debt increases, the central government would control more thoroughly the finances of the CCAA, and second, it would be harder for the CCAA to finance this surge

of debt at a reasonable cost, encouraging a stronger fiscal effort to reduce the deficit.

The second main result from the estimations is that among the economic evolution determinants, only economic growth seems to matter in the debt evolution.[21] Meanwhile, GDP per capita deviation has a negative but weak impact, signalling that those CCAA that have a higher GDP per capita tend to have less accumulation of debt. Nor the Price Index neither the house price inflation seem to have any significant impact on debt evolution.

Other two relevant variables included in this table are the budgetary compliance and the Fund for Suppliers' Payments variable. The former, has a puzzling outcome because it is not significant in the GMM models, and only it is significant in the fix effect model. If the sign of the coefficient is negative, as it is in the fixed effects and the long sample GMM, it means that fiscal non-compliance in the past does not restrict regional governments in the present. The latter has a significant and direct effect on debt evolution as expected, because the funds received since 2012 rose directly the amount of standard debt. Thus, we use the contemporaneous data in order to take into account this specific shock of the transformation of the commercial debt in EDP debt.

Still in Table 1.2, the last four variables are the ones related with the fiscal rules. First, fiscal rules strength index (FRI) in the previous period does not have a significant impact on the debt variation. This is a very striking result, as it is expected that fiscal rules would entail a break on the debt evolution. But, as shown in other previous studies such as Argimón and Hernández de Cos (2012) or Delgado-Téllez et al. (2016), current fiscal rules are not very effective in coping with fiscal non-compliance (deficit control). In Spain, most of the central government control until recently was concentrated on deficit targets compliance. There were no specific debt targets until 2012. Notwithstanding, there are some significant results when interacting the fiscal rules index with GDP growth, the budget balance and the debt-to-GDP ratio in deviations from the CCAA average. As it appears, fiscal rules would tend to be more effective when economic growth is lower and when debt levels are higher and when budgetary balance are worse, but in this case, this result is not significant in the main GMM model. Thus, the two last results are as expected, but it is slightly puzzling that fiscal rules are more effective when economic growth is more dimmed. This could be rationalized if one considers that in bad economic times public finances can be at stress, and tight rules might be necessary to cope with potential sustainability problems.

In Table 1.3 we focus on the analysis of two main channels, the political and the institutional factors. Political factors seem to have a weak effect. Curiously, the only political variable that has some effect is the weight of regional party parliamentarians but neither in the short GMM nor in the FE has any significance. More interesting is the results of the institutional factors' impact. The revenue autonomy plays a key role in debt evolution, as expected. When CCAA have a larger share of their revenues coming from taxes and other sources of revenue that are

[21] We use the lag of the GDP growth to avoid possible endogeneity problems.

directly controlled by the regional government, debt seems to be more stable. This is because first, they can better anticipate the amounts of revenues they will have in an specific year, in contrast to a situation of heightened dependence on central government transfers, and second, regional governments would have more margin of manoeuvre because they could raise tax rates instead of relying on new debt. In the same sense, Vertical Fiscal Imbalances have a direct impact on debt increases, as expected. Finally, only the health expenditure variable displays a direct and significant impact on the dependent variables. This may have to do with the rigidity of health expenditure, with enormous fixed costs and the social resistance to decrease this specific expenditure.

Table 1.4 includes the analysis of the role of market-discipline related variables. The following additional results in this table can be underlined: (i) the two proxies for the cost of financing, the implicit interest rate and the issuance rate behave similarly. An increase in implicit interest rate and the issuance interest rate discourages the increases in debt. Thus the increase in costs would have a deterrent effect on CCAA to augment the debt.[22] (ii) market discipline due to ratings evolution does not seem to work, as the results are not significant in neither of the samples and the sign even changes. (iii) Neither the ratio of short to long term debt nor the ratio of loans by non-residents vs. by residents has a significant effect. In the first case it matches with our hypothesis of ambiguity of the short-long ratio. In the second, it may have to do with a problem related with the data, because it only includes the loans held by foreigner banks and local ones. But there is no data available about securities, and the holding structure of securities may be different from that of loans. (iv) Finally, The ratio of securities over loans presents a negative significant sign. This ratio would imply that regional governments with better access to less "captive" investors (those buying securities) tend to be more disciplined from a fiscal point of view. Thus it would seem that some degree of market discipline is in place.

Finally, in Table 1.5 we show some estimated models to assess the linkages between regional governments' debt and their public corporations' (EEPP) debt and commercial debt[23]. There is no significant effect of the amount of public companies debt. Meanwhile, the commercial debt has a direct and significant impact on debt evolution, so that the dynamic evolution of commercial debt has some predictive power over regional, EDP debt. Even though we do not show it in the table, the results for this variable are alike for the short period 1995-2007.

[22] In the GMM model, the contemporaneous lag of implicit interest rate is included in the estimation so that endogeneity problem may be solved. On the contrary, we considered that the issuance interest rate does no have the problem of endogeneity as it is an average variable of all CCAAs and the data is common for all of them. Therefore the increase in debt in one CCAA should not have a very significant effect on the average issuance rate

[23] This variable, though, is only available for the aggregate of CCAA.

1.5 Conclusions

In this chapter, we study the evolution and the determinants of regional's debt evolution (measured by the change in public debt). The main results of the analysis are as follows. First, political factors played a limited role. Second, fiscal rules also played a limited role, being effective only in bad economic times periods and in situations of high debt. Third, "the fiscal decentralization design", *i.e.* the distribution of revenues and expenditure competencies, is extremely relevant in keeping debt subdued. Fourth, market-disciple plays a role in regional public finances evolution. And fifth, commercial debt seems to have been used as a substitute for regular debt.

Some policy conclusions are worth mentioning. First, the lack of effectiveness of fiscal rules might be read in relation to the economic literature that emphasizes that a set of features are crucial to achieve a certain incidence of any fiscal rule on the behaviour of governments. In this regard, issues such as transparency, the possibility and credibility of penalties for noncompliance, and the existence of independent institutions responsible for monitoring compliance appear as determinants of the success of the fiscal rules. Second, as argued by Oates (2008), fiscal discipline may be enhanced when sub-national governments' spending competences are funded to a larger extent with own revenues. Indeed, in previous studies for the Spanish case, such as Delgado-Téllez et al. (2016), vertical fiscal imbalances play a key role in fiscal non-compliance. Third, market discipline may be key in influencing regional governments fiscal prudence. Fourth, be aware of possible law loopholes. The EDP debt definition does not include as part of the standard definition of debt some potential risks, such as the commercial debt or the public companies debt. Nevertheless, these debts may become standard debt under extraordinary circumstances. Thus, higher level authorities should take into account possible shortcuts governments may use to fulfil targets that do not entail a healthier financial situation. Therefore, commercial debt and public companies debt should be considered as risk for the debt sustainability.

1.6 Tables

Table 1.2: The determinants of regional governments' debt changes (changes as a percent of GDP): baseline models.

Dependent variable: Δ EDP debt	GMM (1995-2017)		GMM (1995-2007)		FE (1995-2017)	
Lagged dependent variable	-0.12*	-0.13*	-0.13	-0.23*	-	-
	(0.06)	(0.07)	(0.16)	(0.13)	-	-
Economic cycle (t-1)	-0.16***	-0.21***	-0.05***	-0.09***	-0.29***	-0.34***
	(0.02)	(0.03)	(0.02)	(0.04)	(0.02)	(0.02)
Budgetary compliance (t-1)	-0.08	-0.03	0.04	0.10	-0.30***	-0.16**
	(0.05)	(0.06)	(0.14)	(0.13)	(0.06)	(0.07)
EDP debt (t-1)	-0.15***	-0.13***	-0.65***	-0.55***	-0.04***	-0.03***
	(0.01)	(0.02)	(0.17)	(0.12)	(0.01)	(0.01)
FFPP	0.12***	0.11***	-	-	0.12***	0.11***
	(0.01)	(0.01)	-	-	(0.01)	(0.01)
Inflation deviation	0.06	-0.04	-0.16	-0.21*	-0.16	-0.25
	(0.16)	(0.16)	(0.13)	(0.12)	(0.18)	(0.18)
GDP per capita deviation	-0.07*	-0.07*	-0.08***	-0.09***	-0.00	0.00
	(0.04)	(0.04)	(0.03)	(0.02)	(0.01)	(0.01)
House Price deviation	-0.02	-0.01	0.01	0.01	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Fiscal Rules x Balance deviation (t-1)	-	-0.03	-	-0.10**	-	-0.10***
	-	(0.03)	-	(0.05)	-	(0.03)
Fiscal Rules x growth deviation (t-1)	-	0.09***	-	0.05	-	0.12***
	-	(0.02)	-	(0.04)	-	(0.02)
Fiscal Rules x debt deviation (t-1)	-	-0.03***	-	-0.05	-	-0.00
	-	(0.01)	-	(0.03)	-	(0.00)
Fiscal Rules Index (t-1)	-0.07	-	-0.04	-	0.06	-
	(0.10)	-	(0.07)	-	(0.07)	-
Number of observations	357	357	187	187	374	374
R-squared	-	-	-	-	0.72	0.75
Hansen[a]	0.50	0.43	0.95	0.75	-	-
m1	0.02	0.09	0.63	0.48	-	-
m2	0.36	0.22	1.00	0.71	-	-

***, **, *: significance at the 1%, 5% and 10% levels.
Instrument set in all models includes the second and third lag of the endogenous variable.
a. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 1.3: The determinants of regional governments' debt changes (changes as a percent of GDP): Political and Fiscal decentralisation variables

Dependent variable: Δ EDP debt	GMM (1995-2017)		GMM (1995-2007)		FE (1995-2017)	
Lagged dependent variable	-0.12*	-0.13*	-0.15	-0.25	-	-
	(0.06)	(0.07)	(0.17)	(0.17)	-	-
Economic cycle	-0.16***	-0.14***	-0.05***	-0.05**	-0.27***	-0.22***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Budgetary compliance (t-1)	-0.08	-0.06	0.05	0.00	-0.40***	-0.21***
	(0.06)	(0.06)	(0.15)	(0.16)	(0.06)	(0.06)
EDP debt (t-1)	-0.15***	-0.14***	-0.59***	-0.50***	-0.02**	-0.04***
	(0.02)	(0.01)	(0.14)	(0.15)	(0.01)	(0.01)
FFPP	0.12***	0.12***	-	-	0.11***	0.13***
	(0.01)	(0.01)	-	-	(0.01)	(0.01)
Fiscal co-responsibility	-	-0.04**	-	-0.02*	-	0.00
	-	(0.01)	-	(0.01)	-	(0.01)
Vertical Fiscal Imbalances	-	0.09***	-	0.07**	-	0.05
	-	(0.03)	-	(0.03)	-	(0.03)
Education expenditure over GDP	-	-0.16	-	0.01	-	0.30*
	-	(0.21)	-	(0.13)	-	(0.16)
Health expenditure over GDP	-	0.48***	-	0.25	-	0.52***
	-	(0.11)	-	(0.24)	-	(0.10)
Investment expenditure over GDP	-	-0.14	-	0.10	-	0.10
	-	(0.19)	-	(0.20)	-	(0.11)
Concordance centre-periphery	0.17	-	-0.05	-	0.17*	-
	(0.19)	-	(0.10)	-	(0.10)	-
% Left-wing parties MPs	-0.01	-	-0.00	-	0.00	-
	(0.02)	-	(0.02)	-	(0.01)	-
Pro-autonomy	0.03**	-	-0.00	-	0.00	-
	(0.01)	-	(0.02)	-	(0.00)	-
Distance to elections	-0.11	-	0.04	-	0.04	-
	(0.07)	-	(0.08)	-	(0.16)	-
Number of observations	343	324	187	154	360	341
R-Squared	-	-	-	-	0.709	0.78
Hansen[a]	0.565	0.496	0.96	0.98	-	-
m1	0.0561	0.0162	0.64	0.86	-	-
m2	0.340	0.127	0.90	0.32	-	-

***, **, *: significance at the 1%, 5% and 10% levels.

Instrument set in all models includes the second and third lag of the endogenous variable.

a. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 1.4: The determinants of regional governments' debt changes (changes as a percent of GDP): Market discipline.

Dependent variable: Δ EDP debt	GMM (1995-2017)				FE (1995-2017)	
Lagged dependent variable	0.06	0.05	-0.06	-0.06	-	-
	(0.06)	(0.06)	(0.06)	(0.06)	-	-
Economic cycle	-0.15***	-0.13***	-0.16***	-0.15***	-0.29***	-0.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Budgetary compliance (t-1)	0.02	-0.03	-0.03	-0.06	-0.24***	-0.26***
	(0.09)	(0.08)	(0.07)	(0.07)	(0.06)	(0.06)
EDP debt (t-1)	-0.25***	-0.20***	-0.18***	-0.18***	-0.04***	-0.04***
	(0.04)	(0.02)	(0.03)	(0.02)	(0.01)	(0.01)
FFPP	0.12***	0.12***	0.12***	0.12***	0.12***	0.13***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating (t-1)	-0.12	-	0.00	-	-	-
	(0.08)	-	(0.06)	-	-	-
Ratio short/long term debt	0.00	0.01	0.00	0.01	-0.01*	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Ratio Securities / Loans	-0.02**	-0.02**	-0.03***	-0.02***	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Ratio debt non-residents / residents	-0.00	-0.00	-0.00	-0.00	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Implicit interest rate	-0.39***	-0.32***	-	-	-0.10***	-
	(0.10)	(0.06)	-	-	(0.02)	-
Issuance interest rate	-	-	-0.04	-0.05**	-	-0.07**
	-	-	(0.02)	(0.03)	-	(0.03)
Number of observations	293	357	293	357	374	374
R-squared	-	-	-	-	0.75	0.74
Hansen[a]	0.28	0.17	0.43	0.43	-	-
m1	0.03	0.01	0.01	0.02	-	-
m2	0.20	0.29	0.94	0.62	-	-

***, **, *: significance at the 1%, 5% and 10% levels.

Instrument set in all models includes the second and third lag of the endogenous variable.

a. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 1.5: The determinants of regional governments' debt changes (changes as a percent of GDP): Non EDP components (public corporations owned by regional governments and other accounts payable).

Dependent variable: Δ EDP debt	GMM (1995-2017)			FE (1995-2017)		
Lagged dependent variable	-0.28***	-0.28***	0.03	-	-	-
	(0.06)	(0.07)	(0.08)	-	-	-
Economic cycle	-0.15***	-0.16***	-0.17***	-0.19***	-0.18***	-0.39***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
EDP debt (t-1)	-0.08***	-0.07***	-0.15***	0.02***	0.02**	0.04***
	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
EEPP debt (t-1)	-0.08	-	-0.00	0.14	-	0.60***
	(0.56)	-	(0.68)	(0.12)	-	(0.13)
Δ EEPP debt	-	-0.24	-	-	-0.36*	-
	-	(0.25)	-	-	(0.20)	-
Commercial debt (t-1)	1.65***	1.63***	-	1.37***	1.46***	-
	(0.29)	(0.28)	-	(0.11)	(0.11)	-
Δ Commercial debt (t-1)	-	-	1.34***	-	-	1.18***
	-	-	(0.27)	-	-	(0.16)
Number of observations	357	340	340	374	357	357
R-squared	-	-	-	0.68	0.69	0.62
Hansen[a]	0.10	0.12	0.03	-	-	-
m1	0.01	0.00	0.00	-	-	-
m2	0.59	0.59	0.36	-	-	-

***, **, *: significance at the 1%, 5% and 10% levels.

Instrument set in all models includes the second and third lag of the endogenous variable.

a. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

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Annex A The fiscal rules framework affecting regional governments

From 1992, following the publication in March of Spain's Convergence Programme, the so-called Budgetary Consolidation Scenarios (BCS) were signed by the central government and each of the CCAAs, further to bilateral negotiations, in which an specific maximum deficit and debt allowed for each CCAA were determined. In March 1995, further to the revision of the Convergence Programme in July 1994, the commitments contained in the BCS were also revised, and the ceilings for the period 1995-1997 were specified. These were changed once again following the approval of the first Stability and Growth Programme in December 1998.

The adoption by Spain of the Maastricht Treaty did not have any specific bearing on sub-national governments' fiscal rules. The subsequent milestone in the definition of the framework of national fiscal rules took place in 2002. The budgetary stability law that came into force in 2002 set a single limit for all CCAAs, though not in terms of debt but only in terms of the budget balance. According to that law, CCAAs and local governments had to meet the principle of budgetary stability, defined as the obligation to post a budget outturn that is in balance or surplus. This law also defined the scheme of sanctions that may be imposed in the event of non-compliance to the CCAAs.[24] The law also provided that, in authorizing the arrangement of credit operations abroad and the issuance of debt and any other resort to public credit, the central government shall bear in mind compliance with the principle of budgetary stability.

A reform of the budgetary stability law was approved in May 2006, which entered into force on 1 January 2008, enabling the central government and CCAAs to adapt their deficit and surplus targets to the economy's cyclical position. Specifically, it allowed the CCAAs to run a deficit of 0.75 percent of GDP if economic growth was below a certain threshold[25], to which a further 0.25 percent of GDP might be added to finance increases in productive investment, including that earmarked for research, development and innovation[26]. It likewise established

[24]Specifically, it states that if the CCAAs do not meet the obligations established under the law and if this leads, in turn, to non-compliance with the obligations of the Stability and Growth Pact, the CCAAs shall assume, in the portion attributable to them, the responsibilities arising from their conduct.

[25]These growth thresholds that determine the possibility of attaining a budget in deficit, in balance or in surplus were set, for a period of three years, by the Council of Ministers, on the proposal of the Minister of Economy and Finance and further to a report by the Council of Fiscal and Financial Policy of the Regional Governments and the National Local Government Board. In particular, during this period of economic growth of less than 2% was projected, the general government deficit could not exceed 1% of GDP (breaking down into a ceiling of 0.2% of GDP for central government, 0.75% of GDP for the regional governments as a whole and 0.05% of GDP for large municipalities). If economic growth was between 2% and 3%, general government should show a budget in balance and, if growth exceeds 3%, a surplus should be run.

[26]In terms of the target-setting procedure, a report was first drawn up assessing the cyclical phase for the following three years. On this basis, the BSL obliged the government to set, first, the budgetary stability target for the three following years in the first half of each year, both for the general government sector as a whole and for each of the agents comprising it; and, second, the State spending limit. Both should be approved by Parliament. Once approved, the individual fiscal target for each regional government was set by means of bilateral negotiations between the Ministry of Economy and Finance and the representatives of each regional government on the Fiscal and Financial Policy Council.

that a significant portion (in no case less than thirty percent) of investment programmes shall be financed with gross saving of the CCAA in question, with only partial resort to debt being permitted. In addition to the extension of the fiscal rules to the lower tiers of government, the BSL had a clause saying that the State shall not take responsibility for the financing of the deficits or public debt of the lower levels of government (no bail-out clause). As to the monitoring procedure, the Ministry of Economy and Finance was required to submit a report to the government before 1 October each year on the degree of compliance with the targets, and on real cyclical developments during the year and deviations from the initial forecast. Should a risk of non-compliance be discerned, a warning may be made to the government agent responsible. If such non-compliance involved a higher-than-targeted deficit, the level of government in question was also required to draw up an economic and financial rebalancing plan over a maximum term of three years. Lastly, it stipulated that, if a deviation from targets prompts a breach of the Stability and Growth Pact, the tier of government involved shall assume the attendant proportion of the responsibilities that should arise from the breach. In addition, in the case of the regional governments, compliance shall be taken into account in the State's authorization of credit operations and debt issues. Specifically, if the failure to meet the stability target takes the form of a greater-than targeted deficit, all the regional government's debt operations shall require central government authorization[27].

Finally, a constitutional reform was approved in September 2011 that enshrined in the Constitution the obligation for all levels of government to adjust their conduct to the principle of budgetary stability. The reform was followed by the approval of a new Law in 2012 [28] that details that the general government deficit in structural terms cannot exceed 0.4% of GDP, sets a limit on government debt of 60% of GDP[29] and an expenditure rule[30]. The 60% debt to GDP limit is distributed as follows: 44% of GDP for the central government, 13% for all and each one of the CCAAs, and 3% of local governments. Moreover, in 2014 a new law added a maximum delay period for suppliers payments of 30 days as a stability target.

[27] However, if the regional government had submitted the economic and financial plan to the Fiscal and Financial Policy Council and the measures contained therein had been declared suitable by the Council, State authorization for short-term credit operations that were not deemed to be external financing was not required.

[28] The budgetary stability and financial sustainability law (LOEFSP), for a more general description and analysis of the 2012 budgetary stability law see Hernández de Cos and Pérez (2013).

[29] Both of which should be achieved following a transition period up to 2020.

[30] This is an important novelty of the new rule. The expenditure rule has been defined in a similar manner as the one incorporated in the 2011 reform of the Stability and Growth Pact. In general terms the growth rate of public spending should not exceed medium-term GDP growth unless it is accompanied by discretionary increases in public revenue. The rule is applied not only to the central government but also to regions.

Chapter 2

On the determinants of fiscal non-compliance: an empirical analysis of Spain's regions

"La vida es una serie de colisiones con el futuro:
no es una suma de lo que hemos sido,
sino de lo que anhelamos ser"

"Muchos hombres, cómo los niños,
quieren una cosa pero no sus consecuencias"

José Ortega y Gasset

This chapter is based on Delgado-Téllez et al. (2018).

2.1 Introduction

The process of fiscal consolidation in Europe in the aftermath of the global and Euro sovereign debt crisis has brought to the forefront the challenges of enforcing fiscal discipline in federal or decentralized countries. The literature on fiscal federalism has attributed this challenge to the presence of soft budget constraints at the subnational level,[1] that is, the inability of subnational governments (SNGs') to keep fiscal deficit outcomes within targets set as part of fiscal consolidation strategies at the general government level. Soft budget constraints have been shown to originate from the inability of central governments (CGs) to credibly commit to not bailing out SNGs and, as a result, to not constrain SNGs fiscal outcomes (Vigneault, 2007). Soft budgets have been shown to be driven by political motives, including re-election and government formation and stability (Sato, 2007). They are aggravated by flawed intergovernmental fiscal institutions, including large vertical fiscal imbalances, weak fiscal rules, and limited market discipline (Rodden et al., 2003; Ter-Minassian, 2015). Flawed institutions act by raising expectations among voters and creditors that the CG must be accountable in the event SNGs are not able to fulfil their spending mandates or debt obligations.[2] Soft budget constraints have been typically assessed by exploring the determinants of fiscal outturns using fiscal reaction functions.[3]

A small but growing empirical literature on the implementation of fiscal consolidations offers a different perspective. Rather than searching for reasons why fiscal outcomes cannot be constrained and targets enforced, it questions whether fiscal targets or the forecasts on which such targets are based are set appropriately in the first place.[4] A number of papers have shown that official forecasts tend to be optimistic among advanced economies (Auerbach, 1999; Frankel & Schreger, 2013; Jonung & Larch, 2006; Leal et al., 2008). Optimistic fiscal forecasts have been attributed to difficulties in forecasting downturns and booms in real time (Beetsma et al., 2013). Another set of factors is related to strategic considerations, which have been shown to be salient in the EU among countries seeking to comply with the Maastricht convergence process (Strauch et al., 2009) and ex ante deficit rules under the Stability and Growth Pact (SGP) (Beetsma et al., 2013; Brück & Stephan, 2006).

This chapter contributes to both literatures by seeking to provide a better understanding of the determinants of fiscal noncompliance at the subnational level. Fiscal noncompliance is defined as SNG budget balance outturns below corresponding targets. The focus is to understand whether fiscal noncompliance is the result of soft budgets or of technical and institutional factors that result in unrealistic fiscal targets. An emerging empirical literature has begun to

[1] See Ter-Minassian (2015) for a review of this vast literature.

[2] Attempts to address some of the flaws in the context of the European Union (EU), in particular strengthening fiscal rules without addressing others (for example, vertical fiscal imbalances), have been shown to be ineffective (Foremny, 2014; Kotia & Lledó, 2016).

[3] see Argimón and Hernández de Cos (2012) for a review of this empirical literature.

[4] Reuter (2015) shows that the introduction of numerical fiscal limits enforced through fiscal rules, even if not complied with, tilts fiscal policy outturns toward those numerical limits. So, in fact, compliance seems to matter less than whether the chosen numerical limit was set to an optimal or appropriate level.

look at the determinants of compliance in rules-based frameworks (Cordes et al., 2015; Reuter, 2015). However, this literature has mostly focused on national policies and has not discussed the institutional and political considerations behind fiscal noncompliance.

This chapter proposes a conceptual framework that tries to distinguish the impact of a soft budget constraint from that of fiscal forecasting and target setting on fiscal noncompliance. The framework looks at both the capacity and the incentives to comply. It distinguishes between events when SNGs have the capacity but not the incentives to comply with fiscal targets from events when SNGs have the incentives but not the capacity for fiscal compliance. Fiscal noncompliance is defined as voluntary under the former and involuntary under the latter. The discussion argues that voluntary fiscal noncompliance is triggered by factors conducive to soft budget constraints, whereas involuntary fiscal noncompliance is the result of factors conducive to unrealistic or ambitious fiscal targets.

Political economy channels and politics take a front seat in this framework. The framework shows that both voluntary and involuntary fiscal noncompliance occur mainly through political economy channels that jointly influence CGs' and SNGs' decisions to, respectively, enforce and comply with fiscal targets. Channels conducive to voluntary fiscal noncompliance act mainly by increasing CGs' political costs of enforcing and decreasing SNGs' costs of noncomplying with fiscal targets. Channels conducive to involuntary fiscal noncompliance are those that increase CGs' political cost of ensuring fiscal targets at the general government level are met, leading the CG to shift the burden of meeting these targets to SNGs. Such costs are determined by the impact such decisions have on the electoral, government formation, and other political objectives government officials and their parties have at the central and subnational levels, which is ultimately framed by politics and political institutions at the supranational, national, and regional levels.

An empirical model is constructed to test this framework. From among a set of economic, institutional, and political factors, the model identifies the ones most relevant to an understanding of voluntary and involuntary fiscal noncompliance. The empirical model is estimated using data from Spain's Autonomous Communities. Spain's Autonomous Communities (hereafter also referred to as regions, regional governments, or simply RGs) makes for an interesting case study for a number of reasons. RGs have gained significant political and fiscal autonomy over the past four decades through a process of decentralization (Hernández de Cos & Pérez, 2013). During this period, regional governments have become accountable for delivering more than two-thirds of social services, mostly in the health and education sectors (Lledó, 2015). The Spanish decentralization has been asymmetric, with revenue and expenditure decentralization occurring at different paces depending on the region, leading to both temporal and cross-sectional variations in both fiscal and political autonomy indicators. Spain's RGs have been subject to nominal budget balance targets for the past two decades. Their record in meeting these targets, as discussed below, has also varied significantly. And so has the rules-based framework used to monitor and enforce compliance with those targets. In addition to fiscal rules, regions have been subject to market imposed discipline, given that most RGs' debt is regularly scrutinized by rating agen-

cies. In this respect, Spain is one of the major subsovereign bond issuers worldwide, presenting a significant heterogeneity across regions in issuing practices and amounts (Canuto & Liu, 2013; J. J. Pérez & Prieto, 2015).

The post-crisis period in Spain has been marked by widespread noncompliance. Regions as a group have missed their targets systematically every year since 2010, accounting for the bulk of the fiscal noncompliance at the general government level and constituting one of the main risks to Spain's ongoing fiscal consolidation process (AIREF, 2016). Critical to this analysis, fiscal noncompliance, while widespread, varied significantly across regions in both frequency and margins.

The existing empirical literature has studied fiscal discipline among Spanish regions by assessing the determinants of fiscal deficit and public debt outturns (for example, Argimón & Hernández de Cos, 2012; Hernández de Cos & Pérez, 2013). This literature has typically looked at economic, institutional, and political factors affecting the size of fiscal outturns irrespective of the targets aimed at constraining them. Critical factors promoting fiscal discipline included greater tax autonomy, higher market-financing costs and credit ratings, and the electoral calendar, but fiscal rules and other political factors are excluded. Fiscal indiscipline appears to have a strong inertial component, with the size of regions' fiscal deficits in one year largely influenced by the size in the previous year. A related literature has also looked at the determinants of the CG's budgetary deviations of the CG (Leal Linares & Pérez, 2011). To the authors' knowledge, Lago Peñas et al. (2016), Leal Marcos and López Laborda (2015) are the only empirical analyses examining the regional determinants of compliance with fiscal deficit targets among Spanish regions.

2.2 Fiscal noncompliance in multilevel governments: a conceptual framework

2.2.1 Defining Fiscal Noncompliance

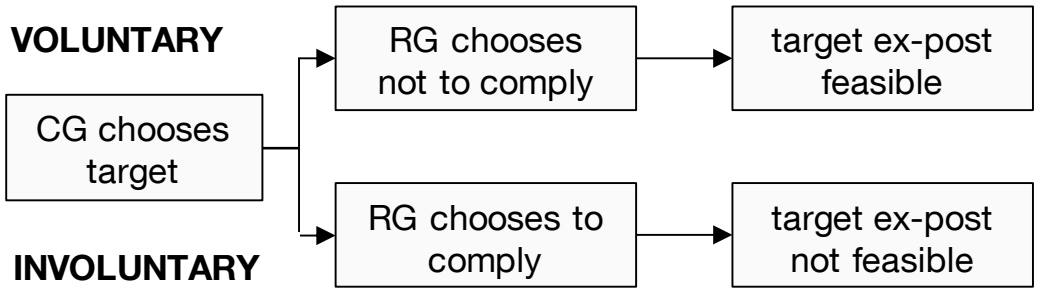
The proposed framework defines fiscal noncompliance as the outcome when a government is unable to meet numerical fiscal targets or ceilings. The fiscal target or ceiling could be the numerical limit of a fiscal rule. A government unable or unwilling to meet a fiscal target or ceiling is defined as non-compliant.

Fiscal noncompliance can be voluntary or involuntary. Fiscal noncompliance is voluntary when the non-compliant government has the capacity but not the incentives to comply with a fiscal target. Fiscal noncompliance is involuntary when the non-compliant government has the incentives but not the capacity to comply with a fiscal target. A government has the capacity to meet the target if it has sufficient fiscal resources or fiscal instruments to garner the necessary resources to meet the target (hereafter, termed fiscal capacity). A government has the incentives to meet the target when the costs of noncomplying with the target outweigh the noncompliance benefits.

2.2.2 The Fiscal Noncompliance Problem

The fiscal noncompliance problem can be characterized as a sequential game between a central and a regional government (Figure 2.1). In the first stage, the CG sets a fiscal target for the RG, knowing the RG's expected fiscal capacity. The fiscal target is ex ante feasible. In the second stage, the RG decides whether to comply with the fiscal target based on expectations about its fiscal capacity and on whether the CG will enforce the fiscal target. In the third and final stage, the CG decides whether to enforce the target based on the RG's compliance decision in the second stage and its expected fiscal capacity. Nature reveals itself only at the end of the game in the form of a shock affecting the RG's fiscal capacity and, therefore, the feasibility of the fiscal target.[5]

Figure 2.1: The fiscal noncompliance problem



Voluntary and involuntary fiscal noncompliance may also emerge as equilibrium outcomes under this game. Voluntary fiscal noncompliance occurs when the RG is not willing to comply with the budget balance target regardless of whether the CG is expected to enforce it, and even when fiscal capacity to comply with the target is highly expected. Under these circumstances, the shock can be assumed away, because the target is feasible both before and after the shock, that is, the target is both ex ante and ex post feasible. Involuntary fiscal noncompliance occurs when the RG is willing to and ex ante capable of complying, but does not have the ex post fiscal capacity to do so.[6]

2.2.3 Voluntary Fiscal Noncompliance and Soft Budget Constraints

Voluntary fiscal noncompliance could be the result of soft budget constraints. RGs with soft budgets are not constrained to finance their spending from an approved budget. Therefore, they would not feel constrained to deviate from fiscal targets set in this budget if doing so will prevent

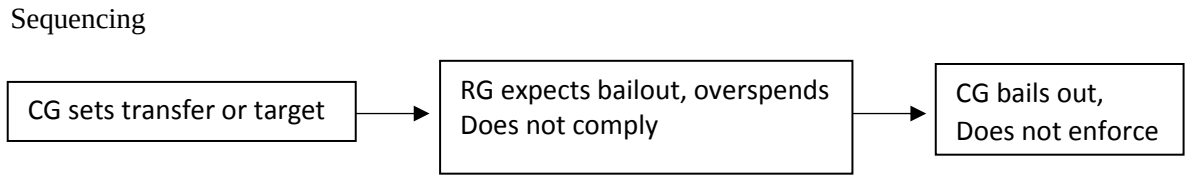
[5] In practice, fiscal target assessments usually occur at a time when factors underlying fiscal capacity, such as nominal GDP, are still only estimates.

[6] Under an involuntary equilibrium, RGs must always be ex ante capable of complying with fiscal targets (that is, fiscal targets must be ex ante feasible). Ex ante infeasible fiscal targets could not be credibly enforced, fostering involuntary noncompliance.

them from providing a desired level of public goods and services. In the multilevel government context, the soft budget constraint problem arises from the CG's lack of a credible no-bailout commitment that allows RGs to overspend in the expectation of an eventual bailout.[7]

Soft budget constraints and voluntary fiscal noncompliance are interconnected. The theoretical literature models soft budget constraints as a sequential game (Bordignon, 2006; Inman, 2003; Rodden et al., 2003; Vigneault, 2007). Actions in the voluntary fiscal noncompliance game described above are logical extensions of the soft-budget-constraint game (Figure 2.2). In the first stage, the CG announces its intergovernmental transfer policy and sets the RG's budget balance target. In the second stage, the RG does not believe the CG's transfer policy, expects a bailout, overspends, and thus deviates from the budget balance target. In the third stage, the CG fulfils the RG's expectation by bailing it out, thereby not enforcing the breach in the budget balance target.[8] Much like in the voluntary fiscal noncompliance game, nature's draw does not make a difference and the target remains feasible.

Figure 2.2: Soft Budget Constraint and Fiscal Noncompliance Problems



Bailout and overspending incentives complement each other to spur voluntary fiscal noncompliance. Two necessary but not sufficient conditions characterize soft budgets and non-compliant governments. The first is that the CG must find it optimal not to enforce the fiscal target and to provide additional resources to the RG in stage 3. It will do so if the economic and political costs of denying additional resources (see below),thereby enforcing the target, exceed the bailout or non-enforcement costs in the form of administrative, legal, or financial penalties, or if the bailout (non-enforcement) is triggered by deviations from national or supranational fiscal rules as well as reputation losses against financial markets and the public at large. Under these circumstances, the bailout or non-enforcement strategy is ex post optimal. The second necessary condition is that the RG, knowing that the CG has an incentive to provide additional resources and not to enforce the target, finds it optimal to overspend and not comply in stage 2 (that is, overspending is ex ante optimal). An ex post optimal bailout will not lead to noncompliance

[7] A bailout is broadly defined to account for not only resources granted to SNGs in the event of a fiscal or financial crisis, such as emergency liquidity funds and outright debt restructuring, but also less extreme situations observed outside crisis. For instance, it may take the form of a change in the allocation of formula grants or simply unconditional gap-filling transfers. A bailout may include situations in which SNGs' borrowing restrictions are lifted, allowing them to borrow to finance above-the-target fiscal deficit levels.

[8] A critical assumption here is that the compliance assessment takes place before the bailout (that is, in the second stage). Bailouts that occur before the compliance assessment period (for example, gap-filling transfers) would help avoid or mitigate fiscal noncompliance. This requires corrective fiscal noncompliance measures or controlling the impact of alternative factors on uncorrected measures so as to take gap-filling transfers into account.

if overspending is not optimal. This may occur, for instance, if a bailout comes with costly conditions attached (for example, loss of fiscal autonomy, unpopular reforms). At the same time, by construction, an overspending optimal strategy cannot exist in the absence of an ex post optimal bailout. In short, for voluntary fiscal noncompliance to occur, factors that raise both bailout and overspending incentives must be in place.

2.2.4 Bailout and Overspending Incentives

CGs may choose to bail out RGs for economic and political reasons.

Economic motives. A benevolent CG that cares for the welfare of the whole nation would choose to bail out a fiscally irresponsible RG to avoid the negative spillovers to other jurisdictions and to itself. Negative spillovers to other jurisdictions,referred to as horizontal spillovers, usually take the form of under provision of health, education, and other essential services by the non-rescued RG to other RGs. Negative spillovers to the CG, or more broadly, to the general government, referred to as vertical spillovers, may occur if default of a non rescued RG endangers the banking system or the corporate sector nationwide because of their exposure to RG debt, thereby increasing fiscal risks and lowering credit ratings at the central or general government level (Inman, 2003). Bailout incentives are expected to decrease with bailout pecuniary costs for CGs and increase with bailout economic benefits. Pecuniary costs are expected to increase with the size of the region: the larger the region, the larger the cost of the public goods and services it provides. However, the impact of region size on bailout economic benefits is ambiguous and depends on assumptions about the "extensive" and "intensive" nature of the spillover. The larger the region, the larger the extensive nature of the spillover: the larger the number of regions and individuals benefiting from the public goods and services provided by that region, the larger the bailout economic benefits (Wildasin, 1997). But the smaller the region, the larger is the intensive nature of the spillover, and the larger the amount of public goods and services appropriated by each citizen in the bailed-out region (Crivelli & Staal, 2013). Bailout incentives are, therefore, expected to increase with RG size if the bailout benefits from the extensive nature of the negative spillovers outweigh both the benefits from its corresponding intensive nature and the bailout pecuniary costs (Wildasin, 1997). Otherwise, bailout incentives are expected to decrease with RG size (Crivelli & Staal, 2013).

Political motives. CGs may also bail out RGs to create the conditions to govern, stay in power, and re-elect their principals. Bailout incentives are greater if directed toward RGs that are well represented in the national legislature, and thus influential for government stability and the passage of critical legislation (Porto & Sanguinetti, 2001). Similar motives may also lead CGs to bail out regions with which they are politically aligned, that is, regions where government incumbents are from the same party or coalition of CG incumbents (Grossman,

1994).[9] The CG may also offer bailouts to ensure national unity (Leite-Monteiro & Sato, 2003). As a result, bailout incentives are likely to increase in regions where representation at the national or subnational level of pro-autonomy parties is larger (Bolton & Roland, 1997).

Flawed intergovernmental fiscal frameworks increase bailout and overspending incentives. They do so by raising expectations among voters and creditors that the CG must be accountable in the event RGs are not able to fulfil their spending mandates or debt obligations (Von Hagen & Eichengreen, 1996). Mindful of the political costs of not fulfilling those expectations, CG bailout incentives will likely increase, raising RGs' bailout expectations and increasing overspending incentives. Rodden et al. (2003) and Ter-Minassian (2015) list a number of institutional flaws that can be broadly categorized as (1) limited fiscal autonomy, (2) lack of preconditions for market discipline, and (3) weak administrative controls and fiscal rules. Limited fiscal autonomy may be the result of RGs' limited taxing powers, spending discretion limited by minimum service standards or revenue earmarking, and overlapping and unclear revenue or spending assignment. Insufficient fiscal autonomy is usually reflected in large gaps between the RG's mandated spending and revenue assignments, that is, large vertical fiscal imbalances (VFIs). The capacity of financial markets to discipline RGs is undermined by regulatory incentives and lax prudential requirements on RG lending, RGs' access to non-competitive financing sources (CG onlending, public and development banks, state-owned enterprises), and lack of transparent and comprehensive public accounts that blur RGs' creditworthiness. Administrative controls such as those guiding RG borrowing are usually not based on clear and objective criteria (for example, ability to service debt). Last, fiscal rules applied to RGs are often poorly designed and weakly enforced.

Common pool financing provides incentives for overspending. When most RG spending is financed out of a common pool of resources with few strings attached, overspending, and by implication noncompliance will become an attractive option. This will be the case because RGs will bear only a fraction of the marginal costs of providing regional goods and services (Von Hagen, 2010). Common-pool financing is usually provided in the form of general purpose, open-ended, and equalization transfers or through debt-mutualisation schemes. The literature shows that excessive dependency on such transfers to finance subnational public goods and services exacerbates overspending.[10]

[9] CG preference for bailing out politically aligned regions could also reflect electoral strategies to target safe electoral districts, that is, regions that had previously largely voted for and elected the CG party or governing coalition (Cox & McCubbins, 1986). Such preferences may not necessarily prevail if the CG follows a swing strategy, whereby it will attempt to target regions that have previously voted for the CG party or governing coalition by narrow margins (Dixit & Londregan, 1996). In some cases, such narrow margins may not have been sufficient for CG politically affiliated regional partners to win the election and form a government.

[10] See Ter-Minassian (2015) for a review.

2.2.5 Involuntary Fiscal Noncompliance and Fiscal Stress

Involuntary fiscal noncompliance may become likelier in times of fiscal stress. These are periods marked by large negative fiscal shocks usually associated with significant economic downturns and large fiscal adjustment efforts. In combination, the two factors have been shown to undermine RG capacity to meet fiscal targets as follows:

Shocks and forecast errors. Economic shocks commonly trigger fiscal stress, making ex ante feasible targets ex post infeasible. Shocks could be region specific (idiosyncratic shock) or they could affect the whole country (common shock). A common shock can affect regions differently depending on each region's economic structure (for example, a bust in housing prices would affect regions where pre-shock median property values had been higher) or exposure to fiscal risks (for example, size of explicit or implicit contingent liabilities assumed by RGs on behalf of public enterprises or regional banks). Large shocks are usually reflected in large forecast errors.[11]

Feasible targets and adjustment plans. In times of fiscal stress, CGs, as guardians of fiscal sustainability, are under pressure from markets and supranational institutions to design and implement ambitious but credible fiscal adjustment plans. Such pressure often leads to ex ante feasible, but very demanding, fiscal targets for the general government (Beetsma et al., 2009). This is particularly the case for the so-called Stability and Convergence Programs of Europe's SGP. In such programs, fiscal targets need to show ex ante compliance with SGP fiscal rules. Ambitious but feasible general government targets in decentralized fiscal frameworks are, in turn, often reflected in ambitious but feasible subnational fiscal targets,as CGs try to shift part of the fiscal adjustment effort to regions by "passing the buck" (Vammalle et al., 2012).[12] Involuntary fiscal noncompliance, as a result, is expected to become likelier as fiscal adjustment to meet a given fiscal target increases. RG adjustment efforts, in turn, may increase if fiscal targets are not revised following fiscal noncompliance in a given year, leading to persistent fiscal noncompliance patterns. Similar arguments explain why CG incentives to enforce RG fiscal targets also increase in times of fiscal stress. Failure to do so will increase the likelihood that general government fiscal targets will be breached and that markets and supranational institutions will hold the CG accountable for general government fiscal noncompliance.

[11] Large forecast errors, as discussed in the introduction, could also be the result of strategic considerations to ensure ex ante compliance with fiscal rules. In the context of the recent global financial crisis, they have also reflected larger-than-anticipated fiscal multipliers International Monetary Fund (IMF), 2015.

[12] This allows CGs to minimize the political costs of fiscal consolidations by preserving the provision of public goods and services under their mandate, while avoiding increasing the burden of their own taxes. CGs may also raise subnational fiscal targets to build buffers for possible noncompliance in different subsectors, RGs included.

2.3 The Spanish fiscal governance framework

Numerical fiscal targets at the regional level go back more than two decades in Spain. They were subject to numerous changes before and after the global financial crisis:

Budget consolidation scenarios and the 2002 Budget Stability Law. Regions were first subject to budget balance limits in the form of fiscal deficit ceilings as part of the Budget Consolidation Scenarios agreed to with the CG after 1992. Fiscal deficit ceilings at the regional level came into law four years later under the 2002 Budget Stability Law (BSL). The 2002 BSL set a single zero-deficit limit for all regions, that is, all regions were obliged to post a budget outturn that was either in balance or in surplus. It also envisaged an adjustment plan with corrective actions in the event of noncompliance. Throughout this period, fiscal deficit ceilings for each region were set as a percentage of national GDP.

The 2006 Budget Stability Law. The reform of the first BSL, approved in 2006, entered in force in 2007 and was implemented as a consequence of an EU-wide reform of the SGP. The 2006 BSL enabled the CG and RGs to adapt their deficit and surplus targets to the economy's cyclical position. Specifically, it allowed the RGs to run a deficit of 0.75 percent of GDP if economic growth was below a certain threshold, to which a further 0.25 percent of GDP could be added to finance increases in productive investment.[13] Fiscal deficit ceilings were also set as a percentage of regional rather than national GDP. The 2006 BSL included a no-bailout clause. It also introduced monitoring and enforcement mechanisms. If a risk of noncompliance was detected by the Ministry of Finance, a warning could be made to the responsible government unit. In the event noncompliance materialized, the non-compliant government was required to draw up an economic and financial rebalancing plan over a maximum term of three years. Last, it stipulated that, if a deviation from targets were to prompt a breach of the SGP, the tier of government involved should assume the attendant proportion of the responsibilities that should arise from the breach. In addition, RGs that failed to meet the deficit target would require CG authorization to initiate any debt operations.

The 2012 Budget Stability Law. Regional fiscal targets were subject to further refinements to comply with EU-wide fiscal governance taking place in the context of the Six Pack, Fiscal Compact, and Two Pack. A constitutional reform approved in 2011 enshrined the rules-based framework in the Constitution. A new BSL approved in 2012 introduced structural budget balance, expenditure, and debt rules at the regional level. The 2012 BSL refined rules-based monitoring and enforcement mechanisms to prevent, correct, and penalize deviations from fiscal rules and targets introduced in the 2006 BSL. Monitoring and enforcement were also reinforced

[13] Under the second BSL, fiscal targets were set in three stages. In the first stage, a report assessing the cyclical phase for the following three years was prepared. Taking into account the cycle, in a second stage, fiscal targets for the general government and subsectors (central, regional, and local governments as well as the Social Security System) taken together were set and submitted to Parliament.Once approved by Parliament and subject to the aggregate RG target, individual fiscal targets for each RG were set by means of bilateral negotiations between the Ministry of Finance and representatives of each RG on the Fiscal and Financial Policy Council.

through improvements in the quality, coverage, and frequency of within the year regional and local budget figures and the creation in 2013 of Spain's independent fiscal council, Autoridad Independiente de Responsabilidad Fiscal. Fiscal deficit limits continued to be measured as a percentage of regional GDP.

2.4 Understanding fiscal noncompliance among Spain's regions

2.4.1 Empirical Methodology

Alternative drivers of fiscal noncompliance among Spanish regions are assessed by looking at noncompliance frequencies and compliance margins. To gather some stylized facts, the analysis starts by examining noncompliance empirical distributions across a number of different potential determinants of voluntary and involuntary fiscal noncompliance. An econometric analysis is then performed to identify whether fiscal noncompliance is likely to be voluntary by looking at the determinants of compliance margins. The sample includes 16 out of 17 Spanish regions over the period 2002-15.[14] Noncompliance events are defined as cases of negative deviations between fiscal outturns and fiscal targets for a given region and year. That is, $f_{it} - f^*_{it} < 0$, where f, f^*, i, and t are fiscal balance outturns, fiscal balance targets, respectively. Noncompliance events are sourced from the annual compliance report submitted by the Ministry of Finance to the Economic and Financial Council (CPFF).[15] The CPFF comprises the Minister of Finance and public finance authorities from each region. While the Ministry of Finance is the ultimate body in charge of overseeing regional finances, the CPFF plays a formal role in the approval of regions' fiscal balance targets.

Noncompliance frequencies are defined in equation 2.1 as the ratio of noncompliance cases to the total number of cases within a particular group X. Groups are partitioned by quartiles (q) if measured on the basis of a continuous variable.

$$P(f_{it} - f^*_{it} < 0 | X_q) where\ q = 1, ...4. \tag{2.1}$$

Compliance margins, $f_e = f^* - f$, are measured in percentages of regional GDP. Officially, they were measured as differences between fiscal outturns and targets as a percentage of national GDP between 2003 and 2007 and as a percentage of regional GDP from 2008 onward. To

[14] Spain has 17 regions (Comunidades Autónomas). Nevertheless, two different centre-periphery financial arrangements are in place. A majority of regions, 15, share the Common Regime of regional finances (Comunidades Autónomas de régimen común), with partial devolution of expenditure and revenues, while the remaining two (Navarre and Basque Country) enjoy a special status referred to as the Foral Regime of regional finances (régimen foral) under which they enjoy almost full spending and revenue autonomy. Within the latter two regions, though, the Basque Country is further decentralized, with revenue-raising responsibilities distributed to lower government levels (diputaciones forales) broadly resembling the provincial structure within the region. The latter region is therefore excluded from the subsequent econometric analysis because of the absence of comparable data.

[15] Available at www.minhap.gob.es/esES/CDI/SeguimientoLeyEstabilidad/Paginas/InformesCompletos LEP.aspx. Two annual compliance assessments have been conducted since 2013. Noncompliance events are defined based on the second and final assessment.

allow compliance margins to be compared over the years and across regions according to a homogeneous metric that at the same time reflects differences in regions' fiscal capacity, official compliance margins have been re-estimated in percentage of regional GDP using the latest nominal GDP series.[16] That was accomplished in two steps: first, nominal deficit values were uncovered by multiplying targets and outturns by the nominal GDP available around the time targets and outturns were, respectively, set and assessed; second, the difference between nominal deficit outturns and targets was divided by the latest nominal regional GDP series.

A dynamic panel regression analysis is used to examine potential determinants of noncompliance margins. Noncompliance margins are regressed on the same variables conditioning noncompliance frequencies. Estimates are derived using Arellano-Bond first-difference generalized method of moments (FD-GMM) estimators to allow for possible inertial patterns in noncompliance as well as endogeneity of dependent variables. Equation 2.2 summarizes the specification:

$$f^e_{it} = \alpha f^e_{i\ t-1} + \gamma INVOL_{it} + \delta VOL_{it} + \eta_i + \epsilon_{it} \tag{2.2}$$

where $INVOL$ and VOL are vectors with factors associated with involuntary and voluntary noncompliance events (hereafter referred to as voluntary and involuntary factors), respectively; η is the CCAA fixed effects, α governs the degree of persistence of RG fiscal compliance and noncompliance, and γ and δ measure the relative contribution of involuntary and voluntary factors to fiscal compliance and noncompliance.[17]

The estimation strategy aims to identify operative economic, institutional, and political factors associated with voluntary and involuntary patterns of fiscal noncompliance. In light of the relatively short cross-sectional dimension, the identification strategy is implemented in a parsimonious way by individually assessing the impact of a larger set of variables expected to encourage voluntary fiscal noncompliance on a baseline that controls for lagged fiscal noncompliance and the more limited number of factors associated with involuntary compliance patterns. To address the problem of overfitting and biased estimates in small cross-section samples stemming from the proliferation of GMM instruments, only the lags t-2 and t-3 are used, and the instruments are combined into smaller sets by using the collapse option in Roodman's xtabond2 package for Stata. The robustness of the results are checked using two-stage least squares (2SLS) estimators.

[16] The regional GDP series used is measured in market prices and in accordance with the new European System of National and Regional Accounts (ESA 2010).

[17] The literature suggests that fiscal deficit at the CG level can encourage deficits at the RG level (see Molina-Parra & Martínez-López, 2018)[for the case of Spain] through the so-called copycat or yardstick effect. Nevertheless, this analysis did not find robust statistically significant evidence to support the hypothesis that fiscal compliance at the CG level influences fiscal compliance patterns at the subnational level. The results are excluded from the chapter for the sake of simplicity.

2.4.2 Testable Hypotheses

The proposed multilevel governance framework developed in the second section can help us understand fiscal noncompliance among Spain's regions. It can do so by helping identify to what extent regional fiscal noncompliance is voluntary. Voluntary fiscal noncompliance can be the result of bailout or overspending incentives driven by welfare or political motives. The framework can also look at the role political, fiscal, and financial market institutions play in shaping such incentives. Fiscal noncompliance could have also been involuntary because of common or asymmetric shocks, and because of fiscal targets and adjustment plans that were borderline feasible. Drawing from this framework and empirical analysis referenced in the previous section, Table 2.1 summarizes some testable hypothesis that are relevant in the Spanish context.

2.4.3 Facts and Factors

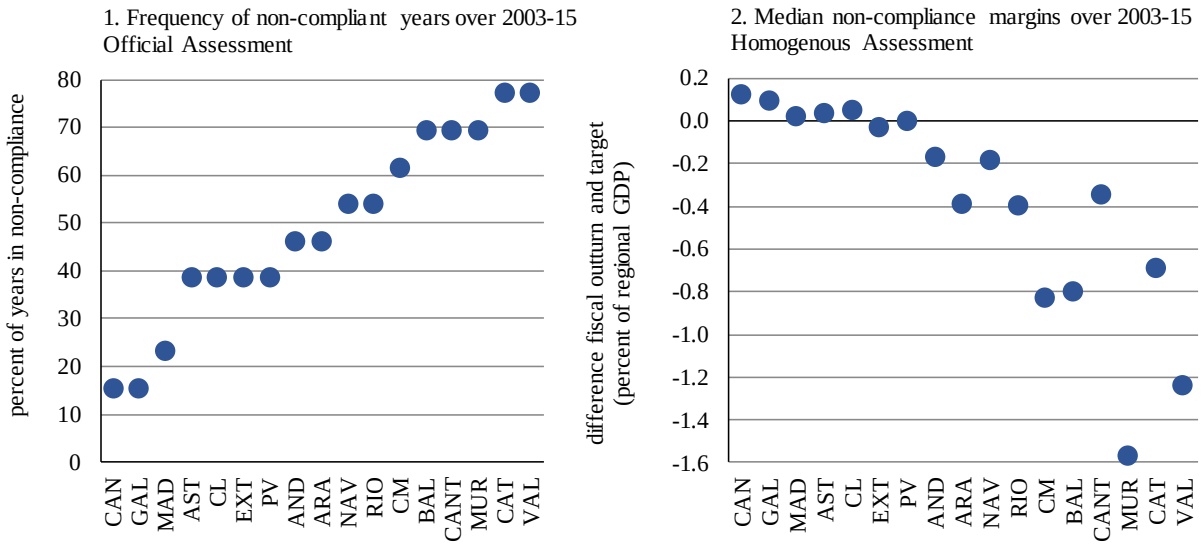
Fiscal noncompliance between 2003 and 2015 varied markedly across regions in both how frequently regions missed the target and by how much these targets were missed (Figure 2.3). Fiscal noncompliance frequencies appear to be stratified into at least three groups: (1) broadly compliers, (2) broadly noncompliers, and (3) largely noncompliers. The broadly compliers comprise regions that have stuck to their fiscal targets in at least half of the years during the analysis periods. This is a large and heterogeneous group demographically, economically, and historically. It includes the Canary Islands, Galicia, Madrid, Asturias, Castile-León, Extremadura, Andalusia, Aragon, and the Basque Country. Navarra, Rioja, Castile-La Mancha, Balear Islands, Cantabria, and Murcia are among the broadly non-compliers regions, missing their targets in up to two-thirds of the years. Finally, Valencia and Catalonia missed their fiscal targets in three-fourths of the years during this period. Just like the first group, regions in the last two groups have very distinct attributes. Noncompliance frequencies and margins appear to be broadly correlated in the sense that more-frequent non-compliers tend to breach their targets by wider margins than less-frequent ones.

Regions' fiscal noncompliance increased markedly in the post-crisis years. The number of noncompliant regions and their corresponding noncompliance margins also increased significantly following the global financial crisis (Figure 2.4). Noncompliance peaked in the post–EU sovereign debt crisis in 2011 when virtually all regions were unable to meet their fiscal deficit targets, most of them by very large margins. This deviation was corrected in the following years through more realistic projections of shared revenues advanced to the regions and supported by fiscal adjustment plans.

2.4.4 Involuntary Channels and Baseline Specifications

Fiscal noncompliance, common shocks, and forecast errors are linked. Common shocks are proxied by observed deviations between nominal (national) GDP growth outturns and forecasts

Figure 2.3: Regions' Noncompliance with Fiscal Deficit Targets



SOURCE: Ministry of Finance; and authors' calculations.
Note: Under the official assessment, fiscal noncompliance eventes are defined as differences between fiscal targets and outtutns in percentage of national GDP between 2003 and 2007 and as a percentage of regional GDP from 2008 to 2015. Under the homogeneous assessment, gfiscal noncompliance events are defined as differences between fiscal targets and outturns in percentage of regional GDP between 2003 and 2015 (see table 2.1). AND=Andalusia; ARA=Aragon; AST=Asturias; BAL=Balear Islands; CAN= Canary Islands; CANT=Cantabria; CAT=Catalonia; CL=Castile-León; CM=Castile-La Mancha; EXT=Extremadrua; GAL=Galicia; MAD=Madrid; MUR=Murcia; NAV=Navarra; PV=Basque Country; RIO=Rioja; VAL=Valencia.

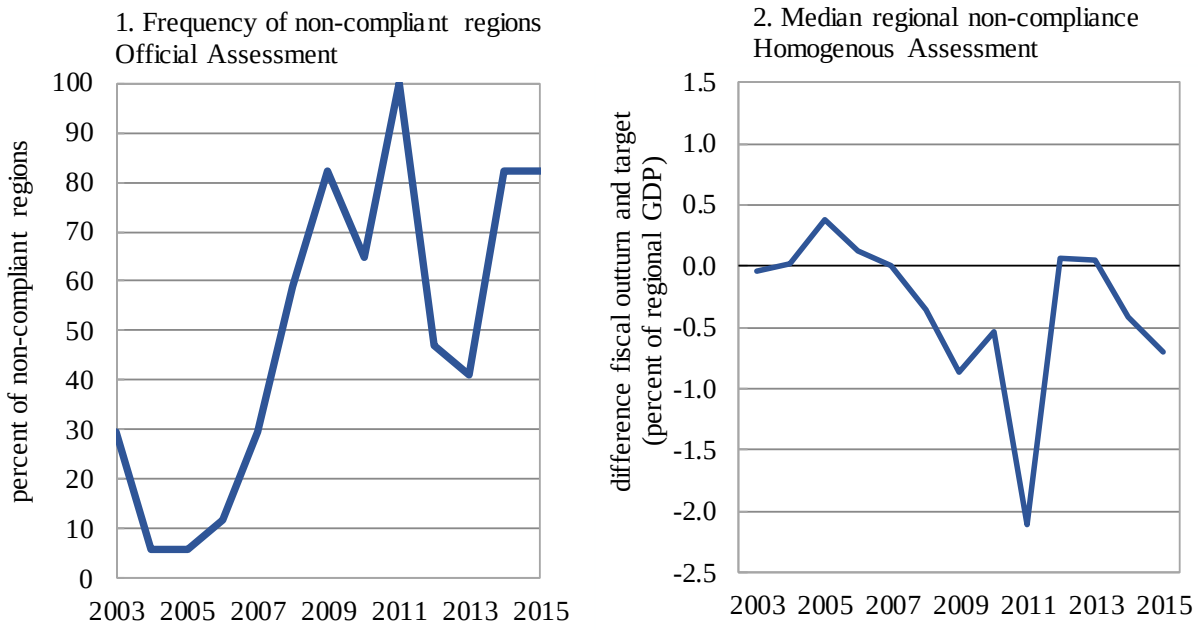
set in annual budget laws (forecast errors).[18] Negative (positive) forecast errors in nominal GDP growth should undermine (bolster) compliance with fiscal deficit targets through corresponding revenue shocks. Noncompliance margins and frequencies have clearly moved in tandem with forecast errors (Figure 2.5). Years when fiscal noncompliance was widespread (2008–11 and 2014–15) have usually been years when forecast errors have been negative.[19] Regression results provide support for the positive correlations between forecast errors and involuntary fiscal compliance, with positive and statistically significant estimates in about half of all estimated models (Tables 2.2 and 2.3).

Idiosyncratic shocks seem to play a limited role in determining fiscal noncompliance. Measured by differences between regions' real GDP growth, consumer price inflation, and house price inflation, and corresponding national averages, positive idiosyncratic shocks are expected to reduce fiscal noncompliance frequencies (Figure 2.6). Contrary to expectations, noncompliance frequencies were either the same (real GDP growth) or larger (consumer price inflation and

[18]The key assumption here is that forecast errors are mostly driven by unanticipated changes in fundamentals and not by technical errors, weak or untimely data, or strategic motives (for example, overestimated nominal GDP growth forecasts to inflate revenue projections and make ex post excessive spending levels ex ante compatible with existing fiscal targets). Strategic motives and technical errors should play less of a role here to the extent that national growth forecasts are set by the centre, where forecasting capacity and data quality are expected to be, on average, better than that of regions.

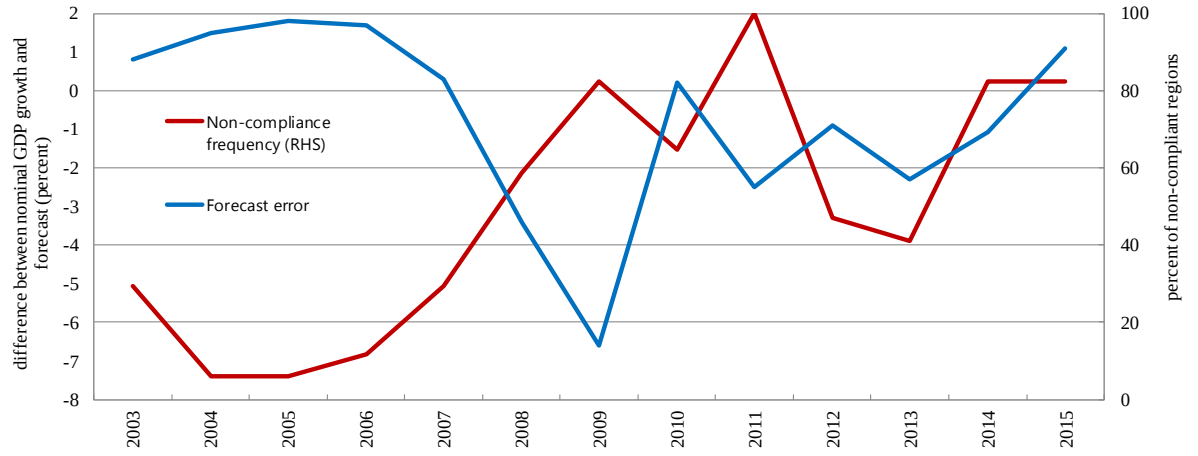
[19]2010 and 2015 (widespread noncompliance and positive forecast error) were exceptions.

Figure 2.4: Evolution of Regions' noncompliance with fiscal deficit targets



SOURCE: Ministry of Finance; and authors' calculations.
Note: Under the official assessment, fiscal noncompliance events are defined as differences between fiscal targets and outturns in percentage of national GDP between 2003 and 2007 and as a percentage of regional GDP from 2008 to 2015. Under the homogeneous assessment, fiscal noncompliance events are defined as differences between fiscal targets and outturns in percentage of regional GDP between 2003 and 2015 (see table 2.1).

Figure 2.5: Forecast errors and regions' noncompliance with fiscal targets

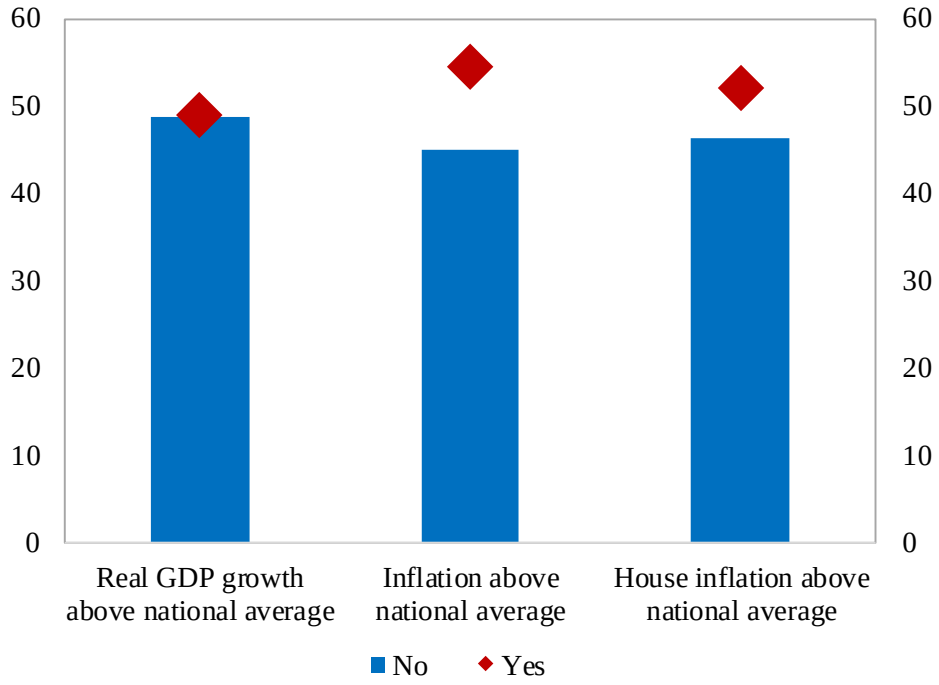


SOURCE: Ministry of Finance; and authors' calculations.

house inflation) among cases in which idiosyncratic shocks were positive. Equally unexpected, positive idiosyncratic growth shocks seem to reduce rather than increase fiscal compliance margins. However, country-specific inflation differentials are not shown to be statistically significant (Tables 2.2 and 2.3). As discussed below, this finding may be explained by the relatively strong transfer dependency observed in most regions and, more specifically, by the fact that a signifi-

cant share of regional finances comes in the form of transfers from the centre allocated with the objective of equalizing regions' fiscal capacity to meet their spending mandates. Thus, reliance on equalization transfers mitigates the revenue impact of region-specific shocks, helping regions safeguard their fiscal capacity and meet their fiscal deficit targets.

Figure 2.6: Fiscal noncompliance and regions' idiosyncratic exposure to shocks



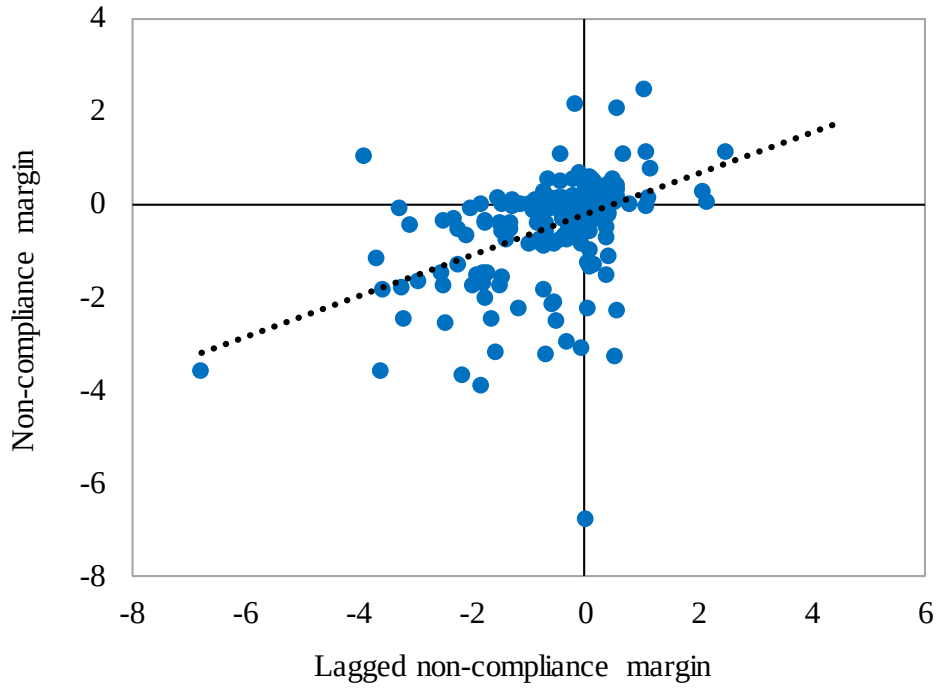
SOURCE: Ministry of Finance; and authors' calculations.

Fiscal noncompliance has displayed some inertial patterns. In line with Lago Peñas et al. (2016), Leal Marcos and López Laborda (2015), fiscal compliance margins appear to be positively autocorrelated (Figure 2.7). As mentioned by Argimón and Hernández de Cos, 2012, this could reflect budget rigidities due to incremental budget processes or multiyear expenditure commitments. Tables 2.2 and 2.3 confirm such inertial patterns under several specifications.

Fiscal noncompliance increases with the required adjustment effort. Adjustment effort is measured by the difference between the fiscal deficit target in years t and t-1, both in percentage of regional GDP, a simple proxy for the required nominal adjustment.[20] Adjustment efforts have been quite heterogeneous across regions given that fiscal deficit targets, despite the existence of different starting fiscal positions, have been set uniformly across regions in most years. As expected, adjustment efforts are found to have a negative and statistically significant impact on fiscal compliance margins in most specifications (Tables 2.2 and 2.3). Estimated coefficients

[20] Adjustment effort could also be measured by the difference between fiscal deficit in year t and fiscal outturns in t-1. Unlike annual changes in fiscal targets, this measure is highly correlated with lagged fiscal compliance margins, and for this reason we have opted to exclude it from the baseline specification. Replacing it with our chosen adjustment effort proxy delivers qualitatively similar results at the expense of rendering lagged fiscal compliance margins statistically insignificant.

Figure 2.7: Inertia in Regions' noncompliance with fiscal targets, 2003-2015



SOURCE: Ministry of Finance; and authors' calculations.
Note: Nominal GDP growth forecast are set in the budget law.

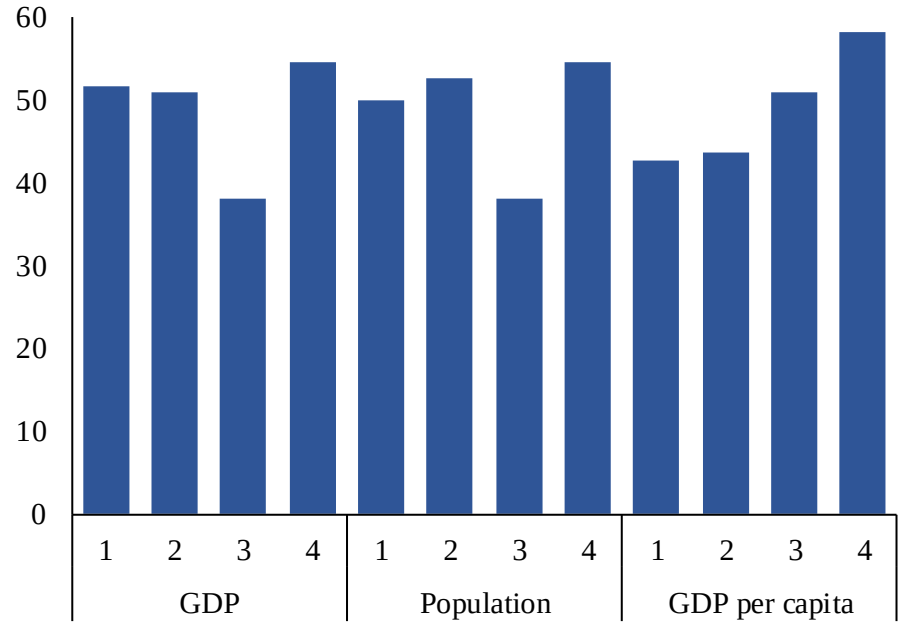
range from 0.5 to 1.0, implying that for each percentage point increase in RGs' fiscal deficit targets, compliance margins should be expected to decline between 0.5 and 1.0 percentage point.

Fiscal noncompliance may decrease if regions benefit from gap-filling transfers before the assessment date, as discussed in the second section. To verify that, we look at differences between actual transfers received by the RG from the CG and those originally budgeted. Noncompliance margins for an RG that receives more transfers than budgeted should be smaller. This hypothesis is rejected, with regression estimates not significant and with the wrong sign (Tables 2.2 and 2.3, model 2). One interpretation is that, while improving regions' fiscal capacity and thus helping stave off involuntary fiscal noncompliance, additional unbudgeted transfers reinforce expectations of further gap-filling transfers by end-year, thus boosting voluntary fiscal noncompliance and more than outweighing the initial deterrent effect.

2.4.5 Voluntary Channels

The analysis finds some tentative evidence of a positive impact of region size on fiscal noncompliance. Region size is measured according to the weight of a region's population, GDP, and GDP per capita in the corresponding national figures. Fiscal noncompliance tends to be more frequent among larger regions (that is, toward the end of the distribution) in all three measures, particularly with respect to GDP per capita (Figure 2.8). Fiscal compliance margins are shown to increase in a statistically significant way with regional GDP and regional GDP per capita only under 2SLS models (Tables 2.2 and 2.3, models 3 to 5).

Figure 2.8: Regions' size and noncompliance with fiscal deficit targets



SOURCE: Ministry of Finance; Ministry of Public Works and Transport; National Institute of Statistics; and authors' calculations.

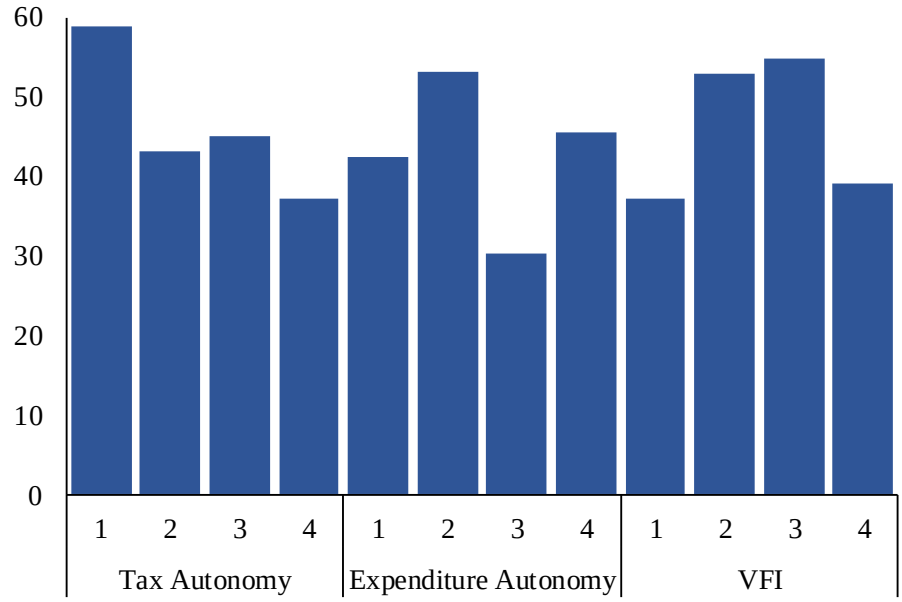
Insufficient *fiscal autonomy* to adjust seems to play a role in determining regions' fiscal noncompliance. To assess the impact of fiscal autonomy, measures of tax and expenditure autonomy as well as of VFIs are estimated. Tax autonomy (in line with the terminology in the local public finance literature) is defined as the share of an RG's total tax revenues over which the RG has some degree of regulatory autonomy.[21] The larger this share, the greater a region's tax autonomy or fiscal co-responsibility, as it is often referred to in the Spanish empirical literature. However, in contrast with the local public finance literature, expenditure autonomy is defined here by the degree of discretion over mandated expenditures. With health and education mostly mandated to regions under centre-imposed minimum standards, and social protection shared with the centre, a larger share of regions' spending on these basic services limits regions' ability to adjust and comply with fiscal targets once their revenue-raising capacity is taken into account. That is, a region's autonomy to cut expenditures is expected to decrease as that region's spending share in basic services increases. With that in mind, the shares of regions' spending on essential public services (health, education, and social protection) and public investment in their total spending are computed.[22] Last, following Eyraud and Lusinyan (2013), VFI indicators are

[21]Regions have regulatory autonomy over personal income taxes (schedules, allowances, credits), wealth and estate taxes and property transfer taxes (schedules, deductions, credits), gambling (exemption, base, rate, credit), and vehicle registration (rates). Significant tax decentralization took place following the 1997, 2002, and 2009 reforms of the regional financing system.

[22]Regions account for two-fifths of total general government spending on essential public services and more than 90 percent when it comes to health and education (F. Pérez et al., 2015), but about 5 percent with respect to social protection.

estimated for each region to capture the extent to which regions are unable to finance their own spending with own revenues, regardless of whether they have regulatory power of the corresponding tax bases.[23] As expected, noncompliance frequencies tend to be smaller among regions in the top tax autonomy quartiles (Figure 2.9), although the relation is not significant with respect to fiscal compliance margins (Tables 2.2 and 2.3, model 6). On the other hand, fiscal noncompliance frequencies are not necessarily the largest among regions in the top expenditure autonomy and VFI quartiles (that is, regions with greater social mandates and less own resources to fund them).24 That said, as expected, fiscal compliance margins decrease as a larger share of regions' expenditures is allocated to social services and public investment-that is, as regions' expenditure autonomy decreases (Tables 2.2 and 2.3, model 6). Finally, regions with large VFIs tend to display lower compliance margins, as shown in Tables 2.2 and 2.3 (models 7 and 13).

Figure 2.9: Regions' Fiscal Autonomy and noncompliance with fiscal deficit (Frequency of noncompliant cases over 2003-14, by quartile, percent)



SOURCE: Ministry of Finance and authors' calculations.
Note: Tax autonomy is defined as the ration between a regional government's own tax revenue and total tax revenues. Expenditure autonomy is region's share of general government spending on essential services. VFI=vertical fiscal imbalance.

The impact of stronger rules on fiscal compliance is not clear-cut. As described in the previous section, fiscal rules in Spain have become increasingly stronger over the years. They are currently among the strictest fiscal rules in Europe, as measured by the European Commission fiscal rule strength index. Stronger rules, however, have not always led to improvements in fiscal compliance, partly because of delays in implementing existing monitoring and enforcement procedures (Lledó, 2015). The regression results seem to reinforce this point. Under the baseline

[23]VFIs are defined as $[1 - OwnRevenue/OwnSpending]$. Own revenue (spending) corresponds to a region's total revenue (spending) minus transfers received from RGs by the CG and other public entities (transfers paid by RGs to the CG and other public entities).

GMM specification, stronger fiscal rules do not show any direct impact on fiscal compliance margins directly. Instead, they seem to have an indirect impact on compliance margins by helping reduce inertial patterns (Table 2.2, models 8 and 9). These results are reversed under the 2SLS specification, which shows fiscal rules having a direct rather than an indirect impact on fiscal compliance margins (Table 2.3, models 8, 9, and 13).

Financial markets seem to affect fiscal noncompliance through two different channels. On the one hand, fiscal noncompliance frequencies are larger among regions with lower (poorer) credit ratings and, to some extent, facing larger market-financing costs, which seems to provide some support to the idea that financial markets undermine fiscal compliance by raising the financing costs of regions that are not perceived as creditworthy (Figure 2.10).[24] On the other hand, fiscal noncompliance becomes less prevalent among regions where reliance on market-issued securities, rather than softer bank loans, is greater. This finding indicates that greater market exposure helps deter fiscal noncompliance because regions internalize the impact fiscal noncompliance would have on credit ratings and market-financing costs. The regression analysis of fiscal noncompliance corroborates the latter channel: increases in the financing costs faced by regions in the previous year tend to increase rather than reduce compliance margins in the following year (Tables 2.2 and 2.3, model 10). However, greater reliance on market securities has no statistically or economically significant impact on compliance margins (Tables 2.2 and 2.3, model 10).

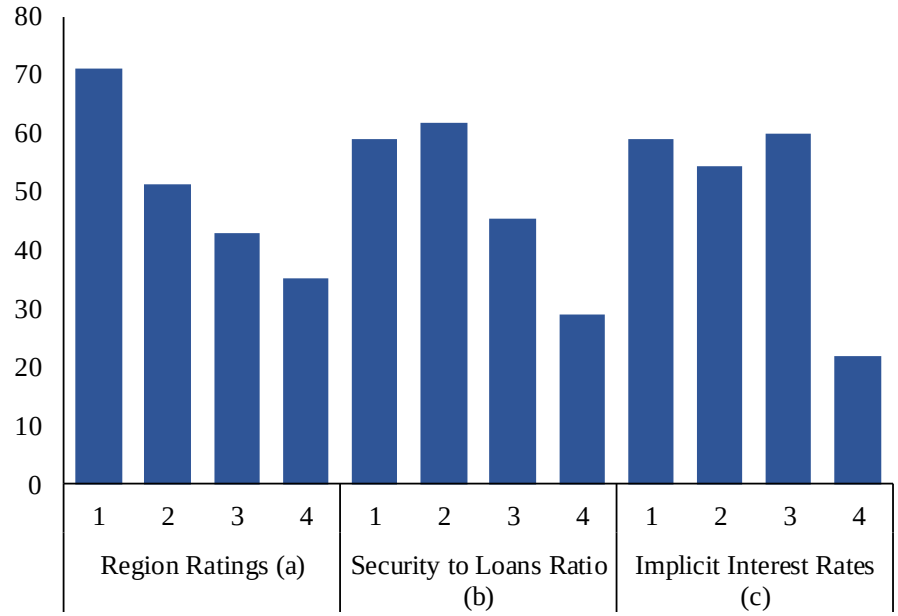
Fiscal compliance is weakened during election years, but the role played by politics in other areas is less clear-cut. Fiscal noncompliance seems to increase during election years. As expected, fiscal noncompliance is more frequent and displays wider margins during election years (Figure 2.11; Tables 2.2 and 2.3, models 11, 12, and 13). Unlike previous fiscal discipline analyses for Spain, but as expected in this framework, political alignment or party congruence between central and regional governments notably increases the likelihood of fiscal noncompliance. In particular, regions politically aligned with the centre are shown to be nearly 1.5 times more likely to deviate from targets than nonaligned regions.[25] The regression results provide only tentative support to these hypotheses: regions aligned with the centre presented smaller, albeit statistically insignificant, compliance margins under most specifications (Figure 2.11; Tables 2.2 and 2.3, models 11, 12, and 13). Pro-autonomy regions, defined by the percentage of members of parliament from regional pro-autonomy parties, expected to deviate from centre-imposed fiscal targets, turned out to be only marginally more likely to deviate from fiscal targets than regions with weaker pro-autonomy preferences, with pro-autonomy regions presenting smaller but statistically insignificant margins under most specifications (Figure 2.11; Tables 2.2 and 2.3, models 11, 12, and 13). Last, regions with the largest political representation in the national

[24] Although one cannot rule out the possibility of reverse causality, with fiscal noncompliance leading to poorer credit ratings, higher risk premiums, and costlier market financing.

[25] As discussed in the section titled "Testable Hypotheses," this may be the result of the CG following a "safe" electoral strategy. Simon-Cosano et al. (2013) show that strategy to be preferred by national incumbents running in national elections, as reflected in the distribution of transfers to regions where the incumbent performs better.

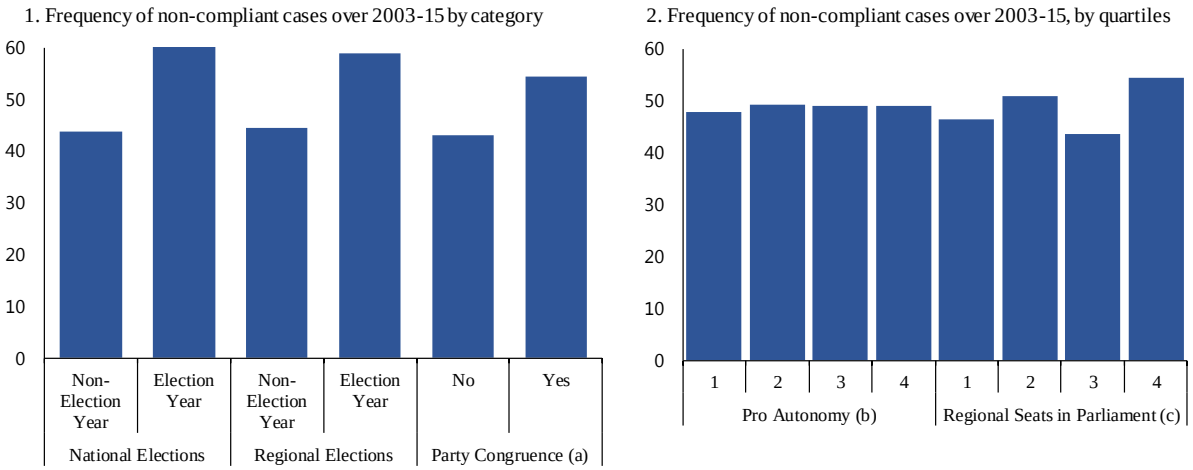
parliament are the most frequent non-compliers, albeit not necessarily with compliance margins that are statistically significantly smaller (Figure 2.11; Tables 2.2 and 2.3, models 11, 12, and 13).

Figure 2.10: Financial markets andd regions' noncompliance with fiscal targets (Frequency of noncompliant cases over 2003-15, by quartile, percent)



SOURCE: Ministry of Finance and authors' calculations.
a. Regional governments' credit ratings. b. Security-to-loans ratio. c. Region's interest payment in percentage of end-of-year regional public debt stock.

Figure 2.11: Politics and Regions' noncompliance with fiscal deficit targets (percent)



SOURCE: Ministry of Finance and authors' calculations.
a. Regional governments' credit ratings. b. Security-to-loans ratio. c. Region's interest payment in percentage of end-of-year regional public debt stock.

2.5 Conclusions and policy discussion

This chapter argues that in multilevel governance systems, SNGs tend not to comply voluntarily with fiscal targets the larger are their compliance costs as well as the costs the CG is expected to incur in enforcing these targets. It proposes a conceptual framework in which these costs can be, first, political and thus determined by factors directly undermining CGs' condition to be elected and form stable government coalitions (for example, the national or regional electoral calendar and RGs' political representation, affiliation, and political autonomy preferences). Second, compliance and enforcement costs are also linked to intergovernmental fiscal frameworks-fiscal rules, tax and expenditure assignments, borrowing controls, and, more specifically, to how these arrangements shape perceptions among voters, creditors, and politicians of SNGs' fiscal autonomy and whether they rather than CGs should be held politically accountable for any disruption in regions' fiscal obligations in the event of noncompliance. Lack of fiscal autonomy shifts political accountability to CGs-thereby raising enforcement costs-while stronger rules and access to financial markets tip the political barometer toward RGs-thereby raising noncompliance costs.

In this chapter's framework, involuntary fiscal noncompliance occurs when SNGs are unable to be fiscally compliant even when they are willing to be. This pattern becomes more likely in times of fiscal stress, defined as periods with large negative fiscal shocks. Fiscal stress times are also periods of increasing domestic or supranational political pressure on CGs to ensure that fiscal consolidation targets at the general government level are met. To minimize the political costs such pressures entail, CGs tend to "pass the buck" of the adjustment down to RGs. This leads to ambitious but feasible centre-imposed SNG fiscal targets that become infeasible once the fiscal shock materializes.

Applied to Spain's regions, this conceptual framework shows that fiscal noncompliance displays involuntary traits. We find fiscal noncompliance to be driven by factors partly outside the control of Spanish regions, namely common macroeconomic shocks and large adjustment efforts. The latter is arguably attributable to ambitious and rigid fiscal targets set by the centre as a result of national and supranational pressures for general government consolidation referred to above.

Fiscal noncompliance among Spain's regions has also been shown to have a voluntary dimension, with fiscal rather than political arrangements playing a somewhat more prominent role. Fiscal deficit targets were missed more frequently and by wider margins the lower a region's autonomy to cut spending due to expenditure mandates and the larger the gap between the resources they can raise to deliver these mandates and their actual costs (that is, the larger VFIs are). Contrary to expectations, stronger and well-enforced fiscal rules have not made fiscal compliance more frequent or compliance margins wider. The analysis has also identified some tentative support for the disciplinary role of financial markets, with increases in regions' market-financing costs reducing fiscal noncompliance margins. The frequency and margins of fiscal noncompliance have also been shown to increase during election years. Other political

factors expected to induce voluntary fiscal noncompliance, such as political autonomy preferences, political alignment with the centre, and political representation, demonstrate ambiguous or non-significant regression estimates.

The main policy lesson in this analysis is that enhancing fiscal compliance in multilevel governance systems requires a more comprehensive assessment of intergovernmental fiscal arrangements that goes beyond strengthening formal rules-monitoring and enforcement procedures. This assessment should include not only rules-based fiscal frameworks but also the assignment of revenue raising and spending mandates and the burden-sharing of fiscal consolidation efforts and related setting of fiscal deficit targets. All that should be accompanied by a focus on making CG enforcement politically credible. In particular:

Rules-based frameworks. To strengthen fiscal compliance at the national level, much emphasis has been placed on the need to bolster rules-based fiscal frameworks with formal enforcement procedures such as financial and administrative sanctions and automatic mechanisms that correct for past deviations from fiscal targets (Schaechter et al., 2012). That has been the case in Spain, particularly after the most recent reforms, which, as discussed, introduced some of these procedures aimed at tackling regional fiscal noncompliance. Looking ahead, there is still some scope to further strengthen existing procedures by making their activation more automatic and by tightening the legal requirements to publicly explain deviations from fiscal targets (Lledó, 2015). Such measures may come in particularly handy during election years when the political costs for the CG to enforce targets are more salient and noncompliance has been shown to be more pervasive than in non-electoral years.

Intergovernmental fiscal responsibilities. In line with previous work looking at the effectiveness of subnational fiscal rules (Kotia & Lledó, 2016), this analysis stresses the need to revisit, and possibly reduce, existing VFIs by ensuring SNGs' revenue-raising and borrowing mandates are consistent with their spending mandates. These measures would help strengthen SNG fiscal autonomy and policy accountability, including for fiscal deficit targets. In doing so, it would make CG enforcement of SNG fiscal deficit targets politically less costly and more credible.

Fiscal consolidation burden sharing. The negative impact of increases in fiscal targets on compliance margins warrants a review of how the burden of fiscal consolidation is shared across and within government levels and, correspondingly, how realistically fiscal deficit targets are set. SNG reputational costs for noncompliance with fiscal targets that are widely perceived as infeasible among voters, markets, and politicians are minimal, rendering even well-designed and well-implemented enforcement mechanisms toothless. In the case of Spain, this may call for the adoption of differentiated fiscal targets across regions to balance adjustment needs with existing fiscal capacity. In light of the impact of negative growth shocks on fiscal compliance, a review is also warranted of how appropriate the technical capacity and procedures behind the formulation of macroeconomic forecasts informing central and subnational budgets and fiscal plans are.

Two additional qualifications are worth mentioning with regard to the normative proposals outlined above that go beyond the scope of this chapter:

First, while the adoption of differentiated fiscal targets might be efficient when conditioning on a given fiscal starting position (that is, a given level of regional deficit and debt), in a more general, dynamic setting, moral hazard arguments dictate that SNGs may develop incentives not to conduct sound fiscal policies in good times. This might be the case when SNGs anticipate that additional room for fiscal manoeuvre is to be granted in crisis times to those governments with weaker initial fiscal positions. The strict implementation of fiscal rules is crucial for the development of ex ante fiscal margins against adverse shocks, and to guarantee that the heterogeneity of structural fiscal positions among regions in normal times is minimized.

Second, international experience shows that the occurrence of subnational fiscal crises cannot be ruled out, even in a setting in which national fiscal rules are fully credible and intergovernmental fiscal responsibilities are set at an optimal level. In the latter regard, the recent Spanish experience indicates that granting to regions additional instruments to prevent liquidity crises is warranted, so that pressure on the CG to financially support or bail out SNGs is reduced. In particular, the possibility of designing rainy day funds with regular contributions during periods of economic prosperity could be studied, along with the development of tools that guarantee the regular access of regions to financial markets even in periods of fiscal stress (Delgado et al., 2016).

2.6 Tables

Table 2.1: Variables Used in the Empirical Analysis

Variable	Description	Source
Lagged non-compliance margin	Regional Fiscal non compliance: difference between the first year deficit estimation and the target	Ministry of Finance
Growth forecast errors	National GDP minus the Ministry of Finance forecast	
Region-National growth differential	Regional GDP growth minus national GDP growth.	National Statistics Bureau
Region-National inflation differential	Regional CPI growth minus national CPI growth.	
Central government non-compliance margin	Central Government Fiscal non compliance: difference between the first year deficit estimation and the target	Ministry of Finance
Cutout	Deficit in the current year minus the deficit in the former one	
Execution minus budgetary transfers (in regional GDP)	Transfers received by the regions from the central government minus the ones included in the budget over the regional GDP.	Ministry of Finance and National Statistics Bureau
Region weight in national population	Regional population over national population.	National Statistics Bureau
Region weight in national GDP	Regional GDP over national GDP.	
Region weight in national per-capita GDP	Regional GDPph over national GDPph.	
Tax autonomy	Regional taxes over which they had some decision power over total regional tax income	Own calculation from Ministry of Finances
Social spending share in regional government spending	Regional spending in basic social services (health education and others) over their total spending.	IVIE and Ministry of Finances.
Investment share in total regional spending	Regional investment over total spending	Ministry of finances
Vertical fiscal imbalances	(1-own income/own expenditure), where own income and expenditure is their respective total amounts net of transfers with the Central Goverment	Own calculation from Ministry of Finances
Fiscal Rule Index	Numerical Fiscal rules index calculated by the European Commission	European Commission
Fiscal Rule Index X Lagged non-compliance margin	Interactions between the lag of non-compliance margin and the Fiscal rule index	
Region Ratings	Average rating numerical index, taking into account three rating agencies: Fitch, S&P and Moody's	Authors calculation from rating agencies data
Implicit interest rates	Budgetary interest payments expenditure over the regions debt	Ministry of Finance
Ratio of security to loans	Total securities issued by the regions over their loans	Banco de España
National election dummy	Dummy for the year of national parliament elections.	Different news papers, webpage of the national and regional parliaments.
Regional election dummy	Dummy for the year of regional parliament elections.	
Party congruence dummy	Political party congruence between national and regional government.	
Pro-autonomy party share	Number of regional MPs that belong to a non-national party over total MPs	
Regions' seats in national parliament	Number of national MPs elected in each region over total national MPs	

Table 2.2: First-Difference GMM Estimates of Fiscal Compliance Margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Lagged non-compliance margin	0.74*	1.09**	0.76*	0.83*	0.76	0.70***	0.37	0.91**	2.42***	0.31*	0.73*	0.49	0.24
Growth forecast errors	0.09*	0.04	0.09	0.10*	0.10*	0.12***	0.04	0.09	0.06	0.05	0.09	0.12***	0.04
Region-National growth differential	-2.09*	-2.67*	-2.16*	-2.13	-2.00	-0.73	-0.60	-2.32*	-1.82*	-0.36	-2.17*	-1.19	0.24
Region-National inflation differential	-0.36	-2.08	-0.39	-1.10	-1.28	-1.27	-2.41**	-1.23	-1.68	-2.83*	0.86	-1.29	-1.19
Fiscal Adjustment	-0.80**	-1.13**	-0.81**	-0.94**	-0.85*	-0.35	-0.82***	-1.02**	-0.99***	-0.51***	-0.68*	-0.52	-0.49
Execution minus budgetary transfers (in regional GDP)		-0.48											
Region weight in national population			3.86										
Region weight in national GDP				7.12									
Region weight in national percapita GDP					0.36								
Tax autonomy						0.03							
Social spending share in regional government spending						-0.33**							
Investment share in total regional spending						-0.24***							
Vertical fiscal imbalances							-0.15***						-0.13**
Fiscal Rule Index								0.05	0.02				0.01
Fiscal Rule Index X Lagged non-compliance margin									-0.06**				
Lagged Annual in Change Region Ratings										0.00			
Lagged Annual Change in Implicit interest rates										-0.09			
Ratio of security to loans										1.03***			0.19
National election dummy											-0.60***		
Regional election dummy												-0.36*	-0.50*
Party congruence dummy											-0.18	0.40	-0.41***
Pro-autonomy party share											-0.31	-0.86	
Regions' seats in national parliament											-0.03	0.00	
Number of observations	176	160	176	176	176	160	160	160	160	145	176	176	144
Number of regions	16	16	16	16	16	16	16	16	16	15	16	16	16
Number of instruments	16	15	16	16	16	15	15	15	15	15	17	17	14
Hansen	0.60	0.80	0.44	0.87	0.66	0.28	0.37	0.82	0.65	0.14	0.68	0.15	0.05
m1	0.12	0.11	0.13	0.15	0.23	0.02	0.09	0.10	0.06	0.14	0.12	0.20	0.00
m2	0.39	0.61	0.43	0.49	0.42	0.48	0.61	0.66	0.77	0.16	0.28	0.22	0.67

Source: Authors' calculations.

Dependent variable is the difference between regions' fiscal deficit outturns and fiscal deficit targets. The larger this difference is, the larger is the fiscal compliance margin.

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Instrument set in all models includes the second and third lag of the explanatory variables.

Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi square under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models.

m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively, using residuals in first differences. The null hypothesis under both m1 and m2 tests is that there is no correlation between variables in the instrument set and the residuals. Observed p-values higher than 0.05 under the m2 test for all models indicates that there is no correlation with the instrument set defined in second lags.

Table 2.3: Variables Used in the Empirical Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Lagged non-compliance margin	0.49**	0.57**	0.49**	0.41**	0.39**	0.52**	0.75**	0.49**	0.46	0.14	0.30*	0.42**	0.79*
Growth forecast errors	0.04*	0.01	0.04*	0.05***	0.05**	0.03	-0.03	0.03	0.05*	0.07**	0.04**	0.05**	-0.02
Region-National growth differential	-0.42**	-0.46**	-0.42**	-0.44***	-0.46***	-0.42**	-0.41*	-0.39**	-0.12	-0.26	-0.27**	-0.38**	-0.40*
Region-National inflation differential	-0.47	-0.50	-0.45	-0.54	-0.55	-0.28	-0.50	-0.46	-0.17	-0.44	0.00	-0.51	-0.55
Fiscal Adjustment	-0.71***	-0.77***	-0.71***	-0.66***	-0.66***	-0.62***	-1.05***	-0.78***	-0.44***	-0.53***	-0.48***	-0.62***	-1.04***
Execution minus budgetary transfers (in regional GDP)		-0.22											
Region weight in national population			-2.59										
Region weight in national GDP				2.73***									
Region weight in national per capita GDP					0.21***								
Tax autonomy						0.02							
Social spending share in regional government spending						-0.29***							
Investment share in total regional spending						-0.06***							
Vertical fiscal imbalances							-0.16***						-0.15***
Fiscal Rule Index								0.14***	0.04				0.07*
Fiscal Rule Index X Lagged non-compliance margin									-0.02				
Lagged Annual in Change Region Ratings										-0.15			
Lagged Annual Change in Implicit interest rates										0.26***			-0.07
Ratio of security to loans										0.00***			
National election dummy											-0.64***		
Regional election dummy												-0.20	-0.27*
Party congruence dummy											0.04	0.13	-0.19
Pro-autonomy party share											-0.58**	-0.78*	
Regions' seats in national parliament											0.00	0.00	
Number of observations	144	128	144	144	144	128	128	128	128	131	144	144	128
Number of regions	16	16	16	16	16	16	16	16	16	16	16	16	16
Number of instruments	6	7	7	7	7	9	7	7	8	9	10	10	11
Hausman test for endogeneity	21.27	24.21	21.1	15.99	12.73	10.28	15.97	12.64	0.01	1.6	9.77	12.68	12.7
	0	0	0	0	0	-0.01	0	0	-0.93	-0.23	-0.01	0	0

Dependent variable is the difference between regions' fiscal deficit outturns and fiscal deficit targets. The larger this difference is, the larger is the fiscal non-compliance margin. All variables defined in level differences.

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Instrument set in all models includes the second and third lag of the explanatory variables.

Standard errors allow for correlation within regions but not among regions (cluster robustness specification).

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Chapter 3

Extraordinary mechanisms for payment of general government suppliers in Spain

"You cannot escape
the responsibility of tomorrow
by escaping it today"

Abraham Lincoln

A shorter version of this chapter is published in *Public Finance and Management Review* (Delgado-Téllez et al., 2017).

3.1 Introduction

The recent economic crisis has had a most adverse effect on public finances in a number of EU countries, with a significant increase in the budget deficit and public debt (see *e.g.* Bird & Mandilaras, 2013). One phenomenon associated with this deterioration in public finances has been the significant increase in the time taken by governments to pay its suppliers and, therefore, in its trade debt (Flynn & Pessoa, 2014). In some countries, public sector trade debt doubled over the initial few years of the crisis, reaching unprecedented levels. Nevertheless, surprisingly enough, the issue of the macroeconomic impact of government trade debt and arrears on private sector activity has received very limited attention in the literature (see Checherita-Westphal et al., 2016).[1]

The recent experience of Spanish public finances poses a natural example to study the impact of government trade debt on the economy. The total amount of consolidated Spanish general government payment obligations outstanding increased to €87.3 billion in 2011 (8.1% of GDP) from €57.1 billion in 2007 (5.3% of GDP). As of 2012, the Spanish government adopted various measures geared to reducing (local and regional) government trade debt volumes. At the same time new regulations, aimed at structurally reducing the payment time, were approved. These policies have had a significant impact on the stock of trade debt and the average supplier payment period. Hence, the consolidated general government payment obligations outstanding in 2013 stood at €58.7 billion (5.6% of GDP), significantly down on the 2011 figure. The reduction is apparently concentrated at the regional and local government level, whose weight in total outstanding general government payment obligations fell to around 50%. Also, on the data recently provided by the Ministry of Finance and General Government ("MHAP" by its Spanish abbreviation), the average payment period for supplier invoices issued between January and November 2014 was around 58 days and 27 days for regional government and local government, respectively, *i.e.* lower levels than observed in previous years.These policies have had a significant impact on the stock of trade debt and the average supplier payment period. Hence, the consolidated general government payment obligations outstanding in 2015 stood at €57.2 billion (5.3% of GDP), significantly down on the 2011 figure.

These developments in general government trade credit in Spain may have exerted significant effects on economic activity. Deferred payment is a standard practice in trade relations. However, an excessive lengthening of the payment period may have harmful effects on creditor companies, which are obliged to resort to alternative sources of financing. In a setting of financial constraints such as that seen during the crisis, these alternatives may not be available or their cost may be very high. Countering this, the trade debt-reducing measures implemented have entailed an injection of liquidity for households and firms, against a backdrop of widespread economic weakness, fiscal consolidation and difficulties for economic agents in gaining access to credit.

[1] As discussed by Checherita-Westphal et al. (2016), the existing literature on government arrears is mostly concerned with measurement issues (see for example Diamond & Schiller, 1993; Ramos, 1998).

This chapter describes the extraordinary mechanisms for payments to suppliers developed in Spain in recent years and quantifies their impact, at least approximately. The chapter is structured as follows. Section 3.2 briefly describes the trend of general government accounts payable in Spain and in other European countries. Section 3.2.2 reviews the various policies implemented to reduce both the stock of trade debt and general government payment periods in Spain. Section 3.3 looks at the main channels through which these policies might exert an influence on the economy's private sector, and the potential effects are quantified using two analytical instruments. First, a purely data based VAR model, estimated over the period 1995Q1-2015Q4. Second, an estimated, large scale macroeconometric model for the Spanish economy that allows for a discussion and quantification of the impact of various theoretical channels. Section 3.4 draws the main conclusions of our study.

3.2 Government accounts payable in Spain: recent trends and policy measures

3.2.1 General government accounts payable from an European perspective

The general government sector commonly uses private suppliers to provide public goods and services, and in doing so it incurs payment obligations with them under certain conditions. The payment of these obligations by general government, as in the case of the private sector, occasionally involves a time lag relative to when the services or goods were actually provided or delivered. Amounts whose payment has been deferred are statistically recorded in what are known as "accounts payable". This trade debt forms part of total general government liabilities, although under European statistical standards it is not part of the public debt for the purposes of the Excessive Deficit Protocol (EDP debt).[2] In Spain's case, the information on this debt is published by the Banco de España in its quarterly financial accounts.[3]

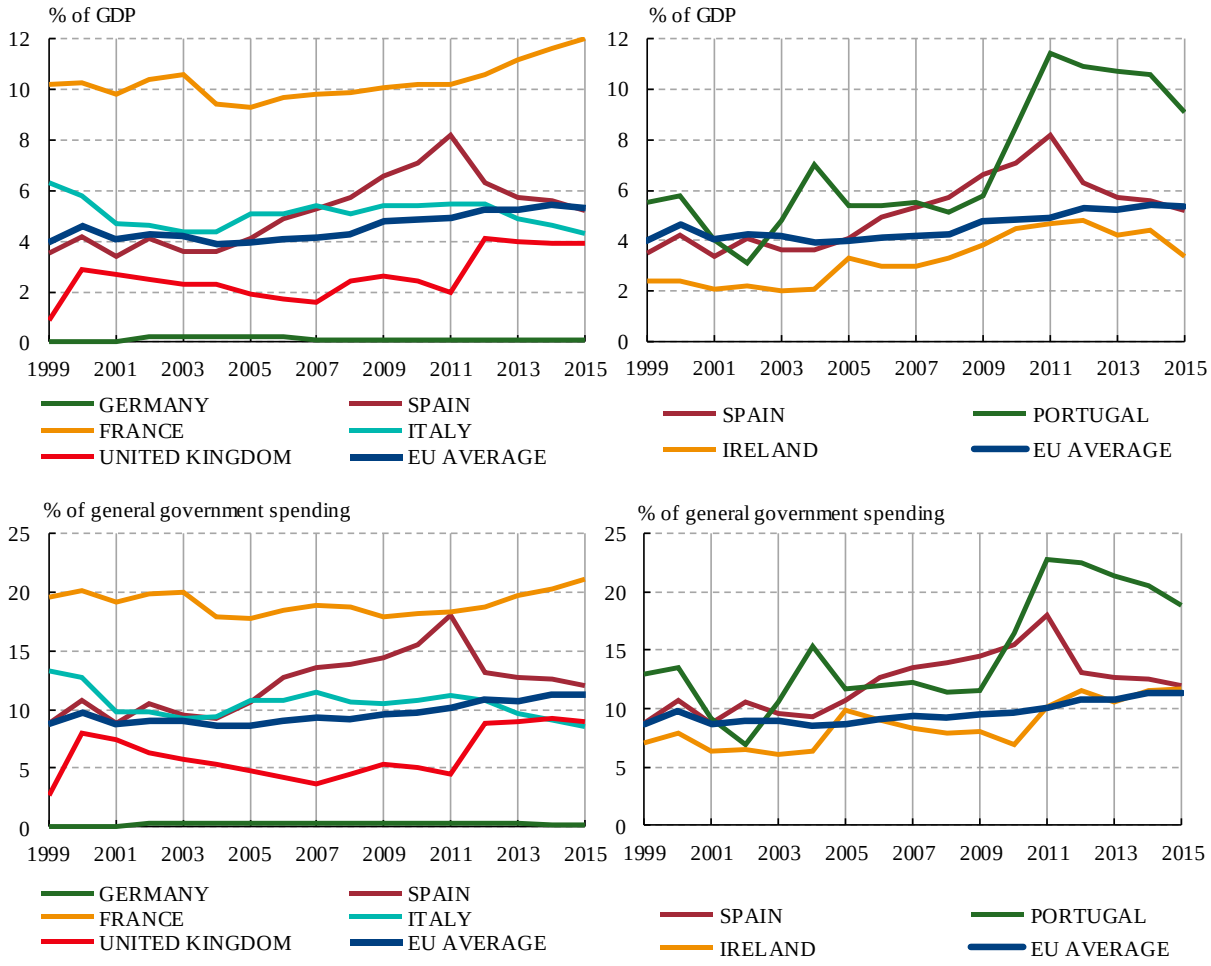
From 1997 to 2007, in the upturn prior to the economic crisis, consolidated accounts payable stood in Spain at around 4% of GDP or 10% of total public expenditure in annual average terms. In comparative terms (see figure 3.1), this figure was slightly below the average for other European countries, which nonetheless show high heterogeneity, ranging from practically zero in Germany to percentages of around 10% of GDP in France, reflecting the different practices prevailing in relations between the general government sector and its suppliers in the different countries.

In terms of agents, most outstanding payment obligations in Spain's case were concentrated

[2]Non-recourse factoring and long-term trade credit are included in EDP debt.

[3]Eurostat only publishes comparable cross-country data of the aggregate "Other accounts payable". Data on accounts payable to non-financial corporations and households are available for the Spanish general government sector. It should be borne in mind, however, that the definition of households includes sole proprietors. Moreover, the data for this distinction are based on estimates. Further, for each "Other accounts payable" figure, there is a breakdown into "Trade credits and advances" and "Other accounts receivable/payable, excluding trade credit and advances".

Figure 3.1: Accounts payable of general government: international comparison (a)



SOURCE: EUROSTAT.
a. Does not include accounts payable to other general government units.
b. EU average does not include Estonia, Croatia, Malta and Slovenia at the start of the time series because of lack of data. Neither does it include Greece for the whole period, as it is no longer available in Eurostat database.

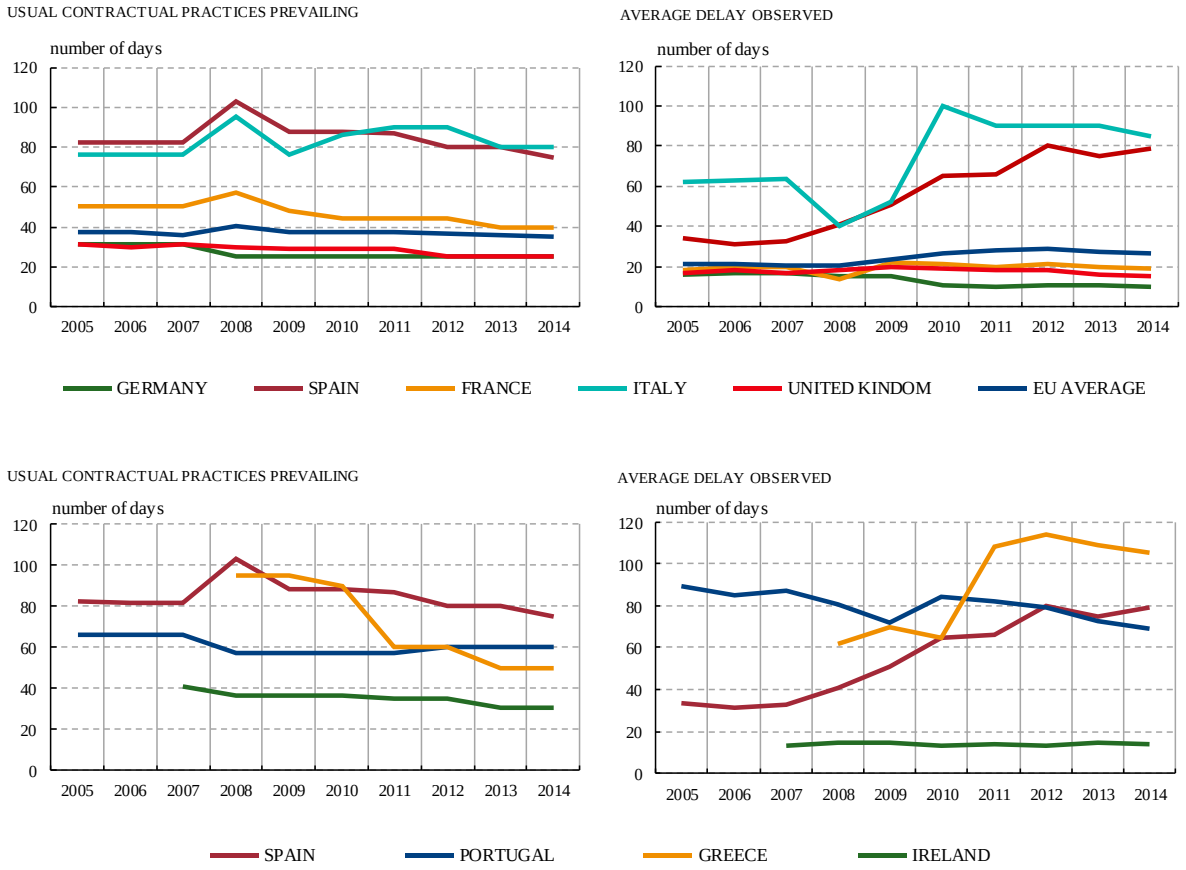
in local and regional government, which accounted for around 65% of such obligations in the 1997-2007 period, with somewhat more than 30% owed by regional government. By type of creditor, almost three-quarters of this debt was to non-financial corporations and the remainder to households.

A supplementary variable that allows for analysis of the volume of outstanding obligations is the average supplier payment period. According to data based on surveys of firms,[4] the general government payment period differs substantially from one country to another (see figure 3.2), both in relation to the usual contractual practices prevailing and to the average delays observed

[4]Source: Intrum Justitia. Written, national language survey conducted in 31 EU countries in the first quarter of the year. In terms of company size, the sample (2014 wave) is made up as follows: 40% of the companies have fewer than 19 employees, 27% between 20 and 49 employees, 27% between 50 and 249, 3% between 250 and 499, 2% between 500 and 2,499, and 1% more than 2,500.

with respect to those practices. Specifically, prior to the crisis, the usual contractually stipulated general government payment period was around 80 days in the case of Spain and Italy, while it stood at 31 days in Germany and the United Kingdom. According to the surveys, payment delays in relation to contractual commitments were especially high in Portugal and Italy, where they exceeded 80 and 60 days, respectively. In Spain's case, these delays stood at around 30 days on average.

Figure 3.2: General government's average supplier payment period: international comparison

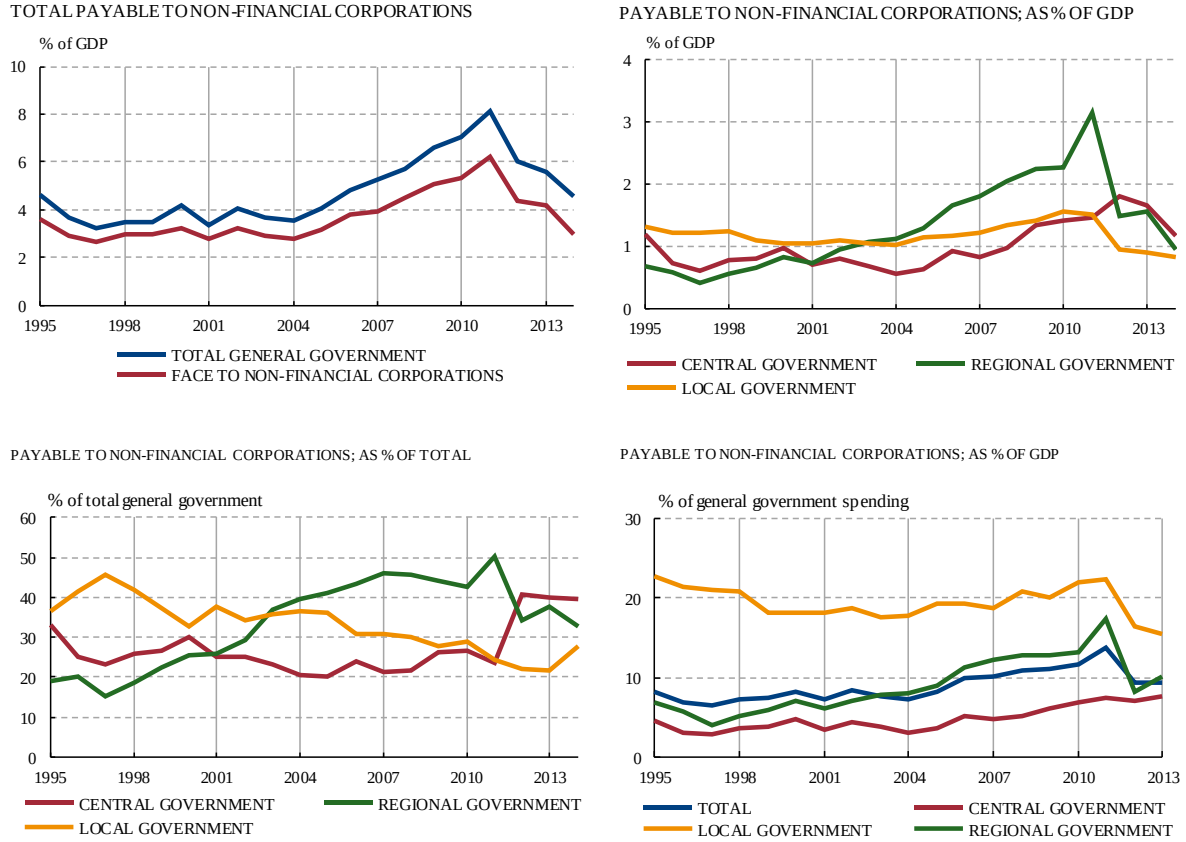


SOURCE: Intrum Justitia.
a. Average of the EU-28 excluding Bulgaria, Croatia, Romania and Slovenia.

The stocks of outstanding payment obligations of most EU countries generally tended to increase during the crisis. These increases were especially significant in Spain and particularly in Portugal and Greece. Specifically, in the case of Spain, accounts payable reached 8% of GDP at end-2011. This increase was seen in all tiers of government and, accordingly, the accounts payable in that period reached 2.4% of GDP in central government, 3.4% of GDP in regional government and 2.1% of GDP in local government. The increase was in payables to both companies and households. The average delays in payments relative to the contractually agreed period are estimated to have increased by approximately 30 days compared with those before the crisis.

Against this backdrop, several countries, including Spain, Italy and Portugal, implemented plans in 2011 and 2012 to reduce their general government trade debt. In general, these plans have managed to reduce or stabilise the trade debt of these countries. In the specific case of Spain, the accounts payable of Spanish general government as a whole to other economic sectors (firms and households) stood in 2013 at around €58 billion (5.5% of GDP), a decrease of 2.5 percentage points (pp) of GDP relative to 2011, which was apparently concentrated in regional government (1.8% of GDP between 2013 and 2011) and local government (0.8% of GDP in the same period). This reduction seemingly occurred in payables to both non-financial corporations and households (see figure 3.3). The most recent data, relating to 2014, show that this trend has continued, taking the ratio of outstanding payment obligations down to 4.5%.

Figure 3.3: General government: Accounts Payable (a) (b)



SOURCES: Banco de España and MHAP.
a. 2016 data relates to the third quarter of the year. 2016 GDP is the aggregation of the quarterly GDP of the last four quarters available.
b. Excluding accounts payable to other general government units.

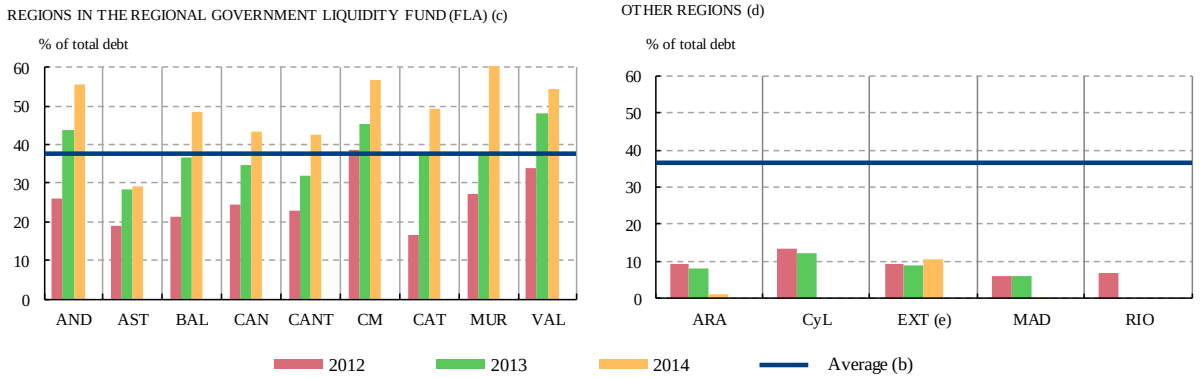
Although surveys of firms do not seem to show a significant decrease in the average delay in payment in the last few years (see figure 3.2), the information published by the MHAP[5] indicates that the average time taken to pay suppliers of State, regional and local governments as at 31

[5]See the MHAP website: http://www.hacienda.gob.es/es-ES/CDI/Paginas/PeriodoMedioPago/PeriodoMedioPago.aspx.

December 2012 was 60, 181 and 109 days, respectively, while the average payment period of supplier invoices issued between January and November 2014 is estimated at around 11, 58 and 27 days for central government, regional government and local government, respectively.[6]

As described in detail in the next section, the various plans to reduce general government trade debt in Spain were financed by the central government, which raised on the financial markets the funds needed to pay the suppliers of regional and local government. The settlement of regional and local government payables under these plans has meant that these tiers of government have replaced their trade debt with debt to central government. Consequently, the EDP debt of regional and local government to the State tripled in the period 2012-2013, such that the percentage of regional government debt which is owed to the State increased from zero to 37% in September 2014 (see figure 3.4).[7]

Figure 3.4: Weight of loans from central government in the total debt of regional governments (a)



SOURCES: Banco de España and INE.
a. The regions of Galicia, Navarre and Basque Country have not received any financing from Central Government loans.
b. Computed as the ratio of the aggregation of all financing received by the regional government from the FLA and FFPP to total regional debt.
c. At 30 November the following regional governments were in the FLA programme: Andalusia (AND), Asturias (AST), Balearic Islands (BAL), Canary Islands (CAN), Cantabria (CANT), Catalonia (CAT), Castilla la Mancha (CM), Murcia (MUR) and Valencia (VAL).
d. Aragon (ARA), Castilla y Leon (CyL), Extremadura (EXT), Madrid (MAD), La Rioja (RIO).
e. Extremadura joined the FLA programme on 11 December 2014.

[6]Several partial sources give a similar picture. More detailed information is available for the State (see the MHAP website: http://www.hacienda.gob.es/es-ES/CDI/Paginas/PeriodoMedioPago/InformacionAAPPs/PMPdelasAAPP.aspx). According to that information, the average payment period of this sub-sector was 38.5 days at end-2011, it increased to 60 days in 2012 and it decreased to 30 days in 2013. The National Federation of the Self-Employed (the "ATA" by its Spanish abbreviation) regularly publishes the results of surveys of the self-employed (http://www.ata.es/), which show that the average payment periods of amounts owed to this group by the various general government units in December 2012 stood at 69, 149 and 177 days for central government, regional government and local government, respectively, whereas in December 2014 these periods were 45, 106 and 74 days, respectively. Lastly, the economic consultancy group SIELOCAL (Sistema de Transparencia Económica Municipal – Municipal Economic Transparency System) publishes an annual report on the average payment period of local government, which fell from its peak of 122 days in 2011 to 74 days in 2013 (http://www.sielocal.com/informe/327/Periodo-medio-de-pago).

[7]For an analysis of the implications of these operations for the debt of general government overall, as well as for the State, regional and local governments, see Gordo et al. (2013, 2014).

3.2.2 Measures to reduce trade debt in Spain

Since early 2012 the central government has applied several measures to mitigate the liquidity problems of regional and local government. Thus, in response to the resolutions of the Fiscal and Financial Policy Council (Consejo de Política Fiscal y Financiera, the "CPFF" by its Spanish abbreviation) of 17 January 2012, two courses of action were undertaken. Firstly, in relation to the regional financing system, the system of advanced payments and deferrals on account[8] was modified. Secondly, the 2012 ICO-regional government facility[9] was set up to cover two tranches: one intended to provide regional governments with funds to meet their payment obligations associated with maturities of regional government financial debt incurred before 1 January 2012 and maturing up to or on 30 June 2012 (refinancing tranche), and another relating to outstanding payments to suppliers.

Subsequently, Royal Decree-Law 4/2012 of 24 February 2012 established an extraordinary financing plan for the payment of local government suppliers, which was later extended to regional governments. This plan set in place a temporary mechanism for the payment of certain trade accounts payable by local and regional governments as at December 2011. The plan was financed by a syndicated loan[10] taken out by the Supplier Payment Financing Fund (Fondo para la Financiación de Pago a Supplier, the "FFPP" by its Spanish abbreviation), created by the Government and 26 financial institutions, and endowed with €30 billion, extendable to €35 billion. The FFPP came into being as a public law entity with legal personality and capacity to issue and raise funds on the markets.[11] To draw on the FFPP, local and regional governments had to commit to an adjustment plan assessed by the MHAP.[12]

Royal Decree-Law 4/2013 of 22 February 2013 gave rise to a second phase of the supplier payment mechanism, which regulated the inclusion of the governments and invoices excluded

[8] The central government undertook to: (1) shift forward to the first half of 2012 50% of the estimated amount of the 2010 financing system settlements in favour of those regional governments which so request; (2) defer up to a maximum of 120 monthly instalments the outstanding amount of the negative settlements of the financing system relating to 2008 and 2009 for those regional governments which so request and which agree on an adjustment programme with the MHAP. The 2008 and 2009 settlements in favour of the State amounted to €5,922 million and €18,947 million, respectively, according to the MHAP.

[9] It was set up in February 2012 to make special-purpose loans under which the ICO paid the financial creditor directly. The maximum interest rate was referenced to the ICO's cost of debt. Thus regional governments had to pay this interest rate plus the ICO's financial market search costs. However, the ICO's search costs and its limited ability to obtain financing on the markets meant that its borrowing conditions were worse than those of the financing obtained by the Treasury (see González, 2013). A total of €5,333 million of loans were granted (see ICO press release of 11 February 2013 reporting the 2012 results).

[10] The syndicated loan was secured by a Treasury guarantee which in turn was secured by the share in State revenue of municipal and regional governments. The loan maturity initially set was 5 years, with a 2-year grace period. The cost for local and regional government is that of the syndicated loan plus operating costs of 0.3 pp and they had to repay the loan in 10 years with a 2-year grace period. These conditions are now softer for municipalities.

[11] As stipulated in Royal Decree-Law 7/2012 of 9 March 2012.

[12] A favourable assessment of the adjustment plan entailed the transformation of the trade debt of local and regional governments into financial debt to the State, while an unfavourable assessment or lack of an adjustment plan could entail retention of the share in State tax revenue.

in the first phase.[13] It was endowed with around €2.6 billion, the amount remaining from the FFPP's initial endowment of €30 billion after deducting the amount of €27.4 billion finally used in 2012.[14]

Finally, in the fourth quarter of 2013 the third phase of the supplier payment plan was approved. It was implemented in two tranches, paid in November 2013 and February 2014, which extended not only the scope of the mechanism,15 16 but also the time horizon of the outstanding payment obligations covered by it. Hence this could be used by local and regional governments to settle due and payable obligations to 31 May 2013. In total, the FFPP has, in its three phases between 2012 and 2014, paid €30.2 billion to regional governments and €11.6 billion to local governments (see Table 3.1).

Table 3.1: Financing received by the sub-national governments from the supplier payment financing fund (a) (b)

	By regional governments				By municipalities
Eur. Million	Total	2012	2013	2014	Total
Total	30,219	17,705	4,544	7,970	11,595
Andalusia	4,955	2,694	634	1,628	3,405
Aragon	513	429	10	74	227
Asturias	243	243			82
Balearic Islands	1,274	842	85	347	450
Canary Islands	315	231	24	59	502
Cantabria	327	327			51
Castilla y Leon	1,052	1,052			453
Castilla La Mancha	3,957	2,918	339	699	569
Catalonia	6,466	2,020	2,169	2,277	820
Extremadura	392	228	7	157	153
Galicia					220
Madrid	1,347	1,257	89		2,882
Murcia	1,789	1,0382	253	499	419
Navarre					1
La Rioja	71	71			7
Valencia	7,519	4,355	934	2,230	1,271

SOURCE: MHAP.

a. The regional and municipal governments of the Basque Country have not received any financing form the FFPP.

b. There have been 4 payments from the FFPP: Phase I in June 2012, Phase II in August 2013, Phase III Tranche I in November 2013 and Phase I, Tranche II in February 2014. Phase II for municipalities took place in June 2013.

Simultaneously with the FFPP, the Government set in train a supplementary mechanism initially designed to provide liquidity to the regional governments so requesting. Its purpose was to cater for situations of strong need for financing at times of tight credit. To this end, Royal Decree-Law 21/2012 of 13 July 2012 on general government liquidity measures set up

[13]Specifically, the expansion of the mechanism affected associations of municipalities, Navarre and Basque municipalities, and new types of contract (administrative licences, management contracts, agreements, property lease contracts and public-private sector cooperation contracts).

[14]For more information see the presentation of the MHAP of 15 November 2013.

the regional government liquidity fund (Fondo de Liquidez Autonómica – "FLA" by its Spanish abbreviation). This is a fund from which regional governments can voluntarily obtain funds, which from the outset has been financed by Treasury debt issuance, so its cost is lower than that of the FFPP. Like the FFPP, the FLA directly services the security and loan maturities which regional governments are unable to refinance. Since it was set up, nine regional governments have joined it.17 Despite its initial purpose, since the end of 2012 the FLA has devoted somewhat more than a quarter of its funds to paying outstanding invoices from suppliers, particularly those for works contracts, supplies and services, and health agreements and pharmacies. In total, between 2012 and 2014, the MHAP released €25.1 billion for supplier payments of regional governments belonging to the FLA (see Table 3.2).[15]

Table 3.2: Financing received by the sub-national governments from the regional government liquidity fund (a)

	By regional governments			
Eur. Million	Total	2012	2013	2014
Total	25,073	6,298	7,019	11,756
Andalusia	5,997	1,729	1,661	2,607
Asturias	586	234	353	
Balearic Islands	1,328	343	533	452
Canary Islands	1,365	406	473	486
Cantabria	510	117	233	160
Castilla la Mancha	1,416	254	431	732
Catalonia	7,339	1,821	1,892	3,626
Extremadura	158			158
Murcia	1,306	241	318	747
Valencia	5,067	1,153	1,125	2,789

SOURCE: MHAP.

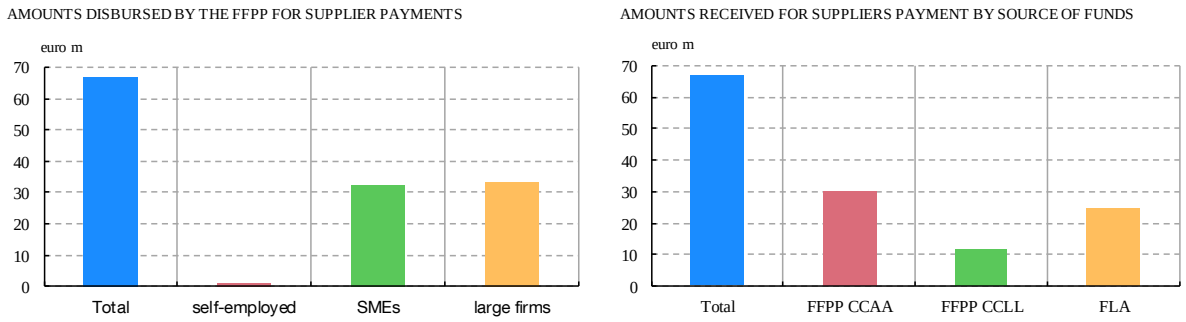
a. Includes payments to suppliers, co-financed grants, dependency, subsidies or transfers to local authorities and universities and others. Therefore, it is the total amount of FLA financing that is not used to pay the debt and interest thereon. Extremadura joined the FLA in December 2014. Aragon, Castilla y Leon, Galicia, Madrid, Navarre, La Rioja and the Basque Country have not received any financing from the FLA.

Thus, between 2012 and 2014, the FFPP and the FLA supplier facility paid outstanding invoices of local and regional governments amounting to €66.9 billion, of which €11.6 billion related to local government and €55.3 billion to regional government (see Tables 3.1 3.2 and figure 3.5). Of the amounts disbursed by the FFPP, somewhat more than 50% was devoted to paying the invoices of large firms, nearly 50% to SMEs and 1% to the self-employed (see Chart 5, left-hand panel).

As a supplement to programmes of this type, different legislative measures were adopted to reduce structurally the payment periods of general government. Specifically, EU Directive 2011/7/EU aims to harmonise at European level the time taken by general government to pay companies and also shorten the payment periods between private sector firms. For dealings

[15]The amount also included co-financed subsidies and those for dependency, local government and universities, and taxes and other.

Figure 3.5: Funds received by the regional and local government for supplier payments (a)



SOURCE: MINHAFP.
a. Includes payments to suppliers, co-financed grants, dependency, subsidies or transfers to local authorities and universities and others. Therefore, it is the total amount of the FLA that is not used to pay the debt and interest thereon.

between general government and private sector firms it sets a payment period of 30 days from receipt of the invoice or, if none, from receipt of the goods or services. This period may be extended in certain circumstances to 60 days. The Directive also establishes minimum financial costs for general government if these deadlines are not met. In 2010 Spain enacted Law 15/2010 of 5 July 2010 amending Law 3/2004 of 29 December 2004 on measures to combat late payment of commercial transactions, which anticipated several of the measures subsequently included in the aforementioned Directive, particularly in relation to payment periods.[16] The transposition was completed by Royal Decree-Law 4/2013 of 22 February 2013 on measures to support entrepreneurs and stimulate growth and job creation.

Also, to strengthen compliance with this legislation, the law on control of trade debt in the public sector came into force in January 2014. This law amends the budgetary stability and financial sustainability law so as to broaden the meaning of the principle of financial sustainability to include trade debt in its scope, since under the budgetary stability and financial sustainability law as originally drafted, the limits on public indebtedness only included the control of public debt as defined in the Excessive Deficit Procedure, which as noted above, excludes trade credit. In addition, it obliges general government to make public its average supplier payment period and approves various measures which general government has to apply unilaterally when the permitted average payment periods are exceeded. Accordingly, the average payment period becomes a crucial tool within the framework of the budgetary stability and financial sustainability law, which establishes a detailed monitoring and sanctioning procedure in the event of non-compliance. Since September 2014 all tiers of general government have made public their average payment periods.

[16] It came into force in January 2013.

3.3 Impact on economic activity of supplier payment funds

3.3.1 Theoretical channels

As noted in the Introduction, the measures to reduce the government's trade debt have entailed an injection of liquidity into firms and households and a normalization of the time taken by general government to pay its suppliers. This increase of liquidity may have had a significant impact due to the contemporaneous situation of economic weakness, fiscal consolidation and lack of market financing.

Quantifying this impact is, however, complex and it is first necessary to identify the transmission channels. For this purpose, it is useful to analyse the effect which may arise from default or late payment. Although deferred payments are normal in trade relationships, excessive lengthening of payment periods has harmful effects on the creditor company.[17] Long delays force businesses to look for alternative means of financing, such as bank loans or they may also delay the payment of their own invoices. But, in times of financial constraint, as the recent crisis, these alternatives may not be available or they may be very costly, thus reducing firms' profitability and perhaps even jeopardizing their liquidity, and ultimately resulting in lowered investment, delays in paying employees and, in extreme cases, closure of the firm.[18]

The impact of lengthening the time taken to pay suppliers probably depends on firm size. Large firms are generally better equipped to mitigate the effect of delays in customer payments by passing on the trade credit fully or partly to their own creditors and being in a better position to negotiate alternative financing with banks. Delayed payment is therefore probably more harmful when the creditors are small and medium-sized enterprises.

The macroeconomic effect of the various supplier payment programs mentioned above is related with the loosening of firms' liquidity constraints. The final effect will depend on whether the creditors consider the plan as a mere early payment of amounts they expected to receive later, or whether this payment is unexpected, *i.e.* the economic agents did not expect to collect, at least partially, the trade accounts payable. In this second case, the expected multiplier effect will obviously be greater. The effect will also depend crucially on the use made by firms of the funds paid by the government. Generally, firms will use these funds to repay bank loans, to pay possible arrears in their employees' wages, to undertake new investment projects or simply to increase their saving for precautionary reasons. The multiplier effect on the economic activity of each of these uses will also differ. The effect can be expected to be larger when the funds are used for investment in fixed capital formation and smaller when they are used to repay bank loans, since in this case the effect on economic activity takes a more indirect path: the positive impact on investment will depend on the extent to which financial institutions use the amounts to grant new loans. Similarly, if the final use is to pay employees' wage arrears, its short-term

[17] See, for example, Connell (2014).

[18] Connell (2014) estimates that in a hypothetical scenario in which delays in general government payments to the business sector were reduced to zero, the firm shut-down rate would be reduced by somewhat more than 7%.

impact will depend on whether the amounts are used for consumption or saving.

Furthermore, the effects of these extraordinary supplier payment mechanisms may depend crucially on the macroeconomic setting in which they arise. The significant lengthening of regional and local government payment periods in the middle of an economic crisis and fiscal consolidation process, added to tight credit conditions, have probably magnified the positive effects of the policy measures taken.

A proper analysis of the macroeconomic impact of the supplier payment plans would therefore require individual data on the firms (and households) affected and knowledge of their credit restrictions and their decisions before and after the supplier payment measures were implemented. That information is not available. There is, however, some disaggregated information on the use of funds which may help to approximate these effects. The data provided by the Ministry of Finance show that 55% of payments from the FFPP were to large firms, 43% to SMEs and the other 2% to self-employed persons. Moreover, 20.3% of payments from the FFPP and 13.5% of the total payments from the FLA were made directly to financial institutions.

Based on this information, the macroeconomic impact of supplier payment programs is estimated below using two analysis tools. First, we construct an illustrative empirical exercise based on a VAR model. Second, a series of simulations, including quantitative estimates, is performed using the Quarterly Macroeconometric Model of the Banco de España Hurtado et al. (2014). This model is specified as a large set of error correction mechanism equations, and is designed for a small open economy within a monetary union, such as Spain. This model enables us to characterize some of the channels through which the supplier payment mechanisms may have operated.

3.3.2 Illustration of the impact of supplier payment mechanisms using a VAR model

The macroeconomic impact of a change in trade credit can be approximated, firstly, by a VAR model including the variables of interest in the analysis. A VAR model is a system of equations which takes each variable included as being endogenous with respect to the others and is thus particularly appropriate for an analysis of these characteristics in which the causal relationships between the variables being analysed may run in different directions.

The fact that the sample has a sufficient, although not prolific, number of observations, would advise a gradual approach to the phenomenon under study. Hence the variables included in the basic VAR model used are general government trade credit, real GDP and government expenditure. The variable used to represent trade credit is general government accounts payable to non-financial corporations. We do not estimate the amount of payments in arrears because our main interest is to evaluate the impact of the extraordinary liquidity for households and firms. Nevertheless, there are other papers that calculate a proxy for the arrears combining the accounts payable with the period estimated from survey data (Checherita-Westphal et al., 2016). They use a GMM model and a Bayesian VAR to estimate the impact of the increase in

arrears on the profitability of firms and on GDP, as well as on the probability of bankruptcy. Meanwhile, in this chapter we estimate the impact of a sudden drop on the trade credits that has been already delayed, and we know the exact amount paid during those years.

In the VAR model we also include the level of government expenditure (in logarithms) to control for the fact that an increase in government expenditure may be associated with an increase in trade credit, since the latter consists of a delay in payment of the former (see Checherita-Westphal et al., 2016).[19] However, against a background in which general government has limited access to financial markets, the relationship between these variables could reverse if general government responded to this situation by simultaneously cutting government expenditure (fiscal adjustment) and delaying payment to suppliers.

The following additional variables are also included in alternative specifications: the inflation rate (measured by the GDP deflator), a measure of the cost of the financing needed to cover the operating needs which was intended to cover with the trade credit (for which a 3-year interest rate is used), a measure of the degree of financial tightness of the economy (through the volume of loans from the financial sector to the non-financial private sector, excluding house purchase loans to households) and a measure of the financial situation of the business sector (proxied by the real gross value added of the market economy). The sample available to estimate the models consists on quarterly data and covers the period 1995Q1-2015Q4. A constant and a linear trend are included in all specifications.

The VAR lag structure is determined employing the usual statistical criteria. For the basic specification, the number of lags according to the Akaike information criteria is 3, while for the Schwarz and Hannan-Quinn information criteria is 2. Our basic specification will therefore take into account 3 lags. Nevertheless, the results do not change qualitatively with 2 lags.

The upper panels of Figure 3.6 show the impulse-response functions of real GDP and trade credit (both variables are in logarithms) when there is an unexpected decrease (shock) in the latter variable.[20] The Figure depicts the generalized impulse-response functions of Pesaran and Shin (1998), which are robust to the ordering of the variables in the VAR. The confidence bands are calculated by asymptotic methods.

The model dynamics behave as expected. GDP responds by increasing from the first quarter in which the shock occurs and continues to rise persistently in the ensuing periods.[21] Also, the decrease in trade credit is accompanied by an increase in government expenditure (bottom panel of the figure). Thus, according to our model, a decrease in trade credit is likely to have a

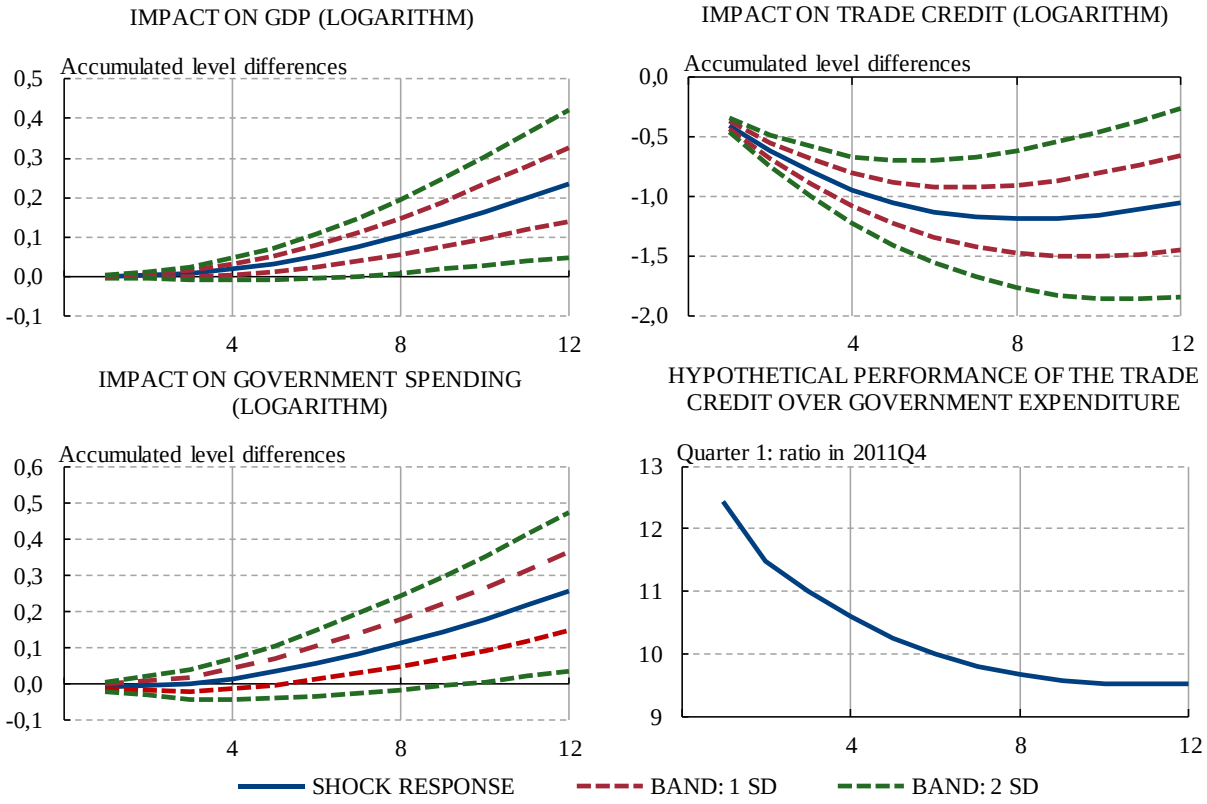
[19] Unlike real GDP, which is taken from the Quarterly National Accounts, trade credit and government expenditure are not seasonally adjusted. We seasonally-adjust the former using the TRAMO/SEATS program, and take the latter from the quarterly fiscal database of de Castro Fernández et al. (2018).

[20] The initial shock is equivalent to one standard deviation of the variable. The path of trade credit in Figure 3.6 has been normalised to show a cumulative change of 1% so that the panels are simpler to read.

[21] In the model, moreover, trade credit exhibits high persistence, *i.e.* an initial reduction in trade credit generates decreases in the following quarters, so the total shock received by the economy is bigger than the initial one. For this reason the results should be analysed in cumulative terms, as in the figure.

positive effect on real GDP over the course of several years. In particular, if the results of the figure are taken at face value, a 1% unexpected decrease in trade credit would give rise to an increase in real GDP of around 0.2 pp, in cumulative terms after 3 years (see upper left-hand panel of Figure 5). This result is robust in all the specifications. In terms of the ratio of trade credit to government expenditure (see lower right-hand panel of Figure 3.6), the shock would reduce that ratio by close to 25% in 3-years, 3 pp in cumulated terms, taking as starting point its value in 2011Q4.

Figure 3.6: Var model: impact of a reduction of general government's trade debt (a)

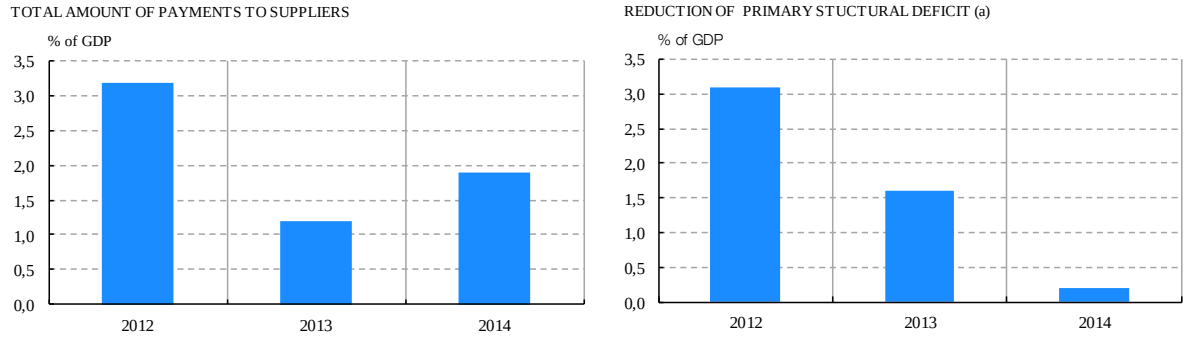


a. Accounts payable by General Government to non-financial corporations.

Based on these results, an estimate can be made of how GDP would be affected by the decrease in trade credit associated with the supplier payment plan. According to the information in Figure 3.3, the ratio of all general government accounts payable to non-financial corporations (our measure of trade credit in the VAR) to government expenditure decreased by around 4.0 pp between 2011 Q4 and end-2013. If it is assumed that all the change in this ratio is due to the supplier payment program, based on the estimate obtained from the model and given that this is linear, the positive impact of the program on real GDP may be around 0.3 pp of GDP in 3-year cumulated terms. These estimates do not, however, take into account the possibility that the funds made available may have had differing impacts on the economy, depending on whether they were paid directly to financial institutions, on the size of the recipient firms and on other factors. In addition, the evolution of government expenditure in this period was determined by

numerous factors. Moreover, this plan was implemented during a fiscal consolidation process. As figure 3.7 shows, the fiscal effort was significant in the years 2012 and 2013. Therefore, the Plan has probably compensated a portion of the negative effects of this consolidation on GDP.

Figure 3.7: Annual amount of supplier payments and structural balance of the general government



SOURCES: Banco de España and European Commission.
a. According to the European Commission

3.3.3 The impact of supplier payment mechanisms through the lenses of a macroeconometric model

In addition to the above VAR-based analysis, we simulate in this Section the impact of the supplier payment plan on the main macroeconomic variables by making use of the Quarterly Macroeconometric Model of the Banco de España (Hurtado et al., 2014). This is a large-scale macro-econometric model used in the elaboration of the medium term macroeconomic forecasting of the Spanish economy, as well as for performing policy and scenario simulations. The model is specified as a large set of error correction mechanism equations, and, especially in the short run, is mostly demand driven: the usual main transmission channel for most shocks is that they affect a demand variable (consumption, investment or exports), and this change in demand forces firms to adjust employment and investment, affecting households' income (which in turn generates second-round effects on consumption and housing investment), prices (through the Phillips curve) and unemployment (which, together with prices, also affects wages).

As a means of including the various channels mentioned in earlier sections, the supplier payment plan is simulated as an increase in transfers from the public sector to households and firms, and through an increase in the credit available in the economy, for the various quarters in which payments were made between 2012Q2 and 2014Q4. Both transfers and credit availability have a direct effect on consumption, housing investment, and private productive investment. This triggers all the transmission channels described above: firms react to higher demand, households to higher income, prices move according to the Phillips curve, and so on, until the new general equilibrium is reached. The magnitude of the effect, though, will depend on a set of initial assumptions regarding the size of the shock. The difficulties in using a macroeconomic model to estimate the impact of the supplier payment fund are, however, numerous. As mentioned above,

we do not have an accurate knowledge of the final use of the funds or of how they are used by the various agents, so various assumptions have to be made to carry out the simulations.

An initial simulation (scenario 1) is performed under the following assump-tions. First, it is necessary to allocate the amounts of the plan funds according to their use by economic agents (financial institutions, households and firms), given that, as indicated in a previous section, the expected impact depends crucially on this factor. Under scenario 1 it is assumed that all the amounts paid by supplier payment financing funds and the FLA directly to financial institutions do not increase household income, but rather raise the availability of credit in the economy. Specifically, on the available information it can be estimated that around 17.6% of the total funds were paid directly to credit institutions. As noted above, the economic activity multiplier derived from this part of the funds is expected to be lower, given that the effect depends on the extent to which this higher available credit is used by financial institutions to grant more credit and, in turn, depends also on how firms and households used this fresh credit granted to them.

Under this first scenario it is also assumed that, disregarding the aforementioned amounts, all the payments of funds to individuals and half of those to SMEs correspond under the model to a transfer to households. The other payments to SMEs and large firms are considered as injections of funds into firms. According to these assumptions, around 60% of the total funds entailed a transfer to firms and the remainder to households.

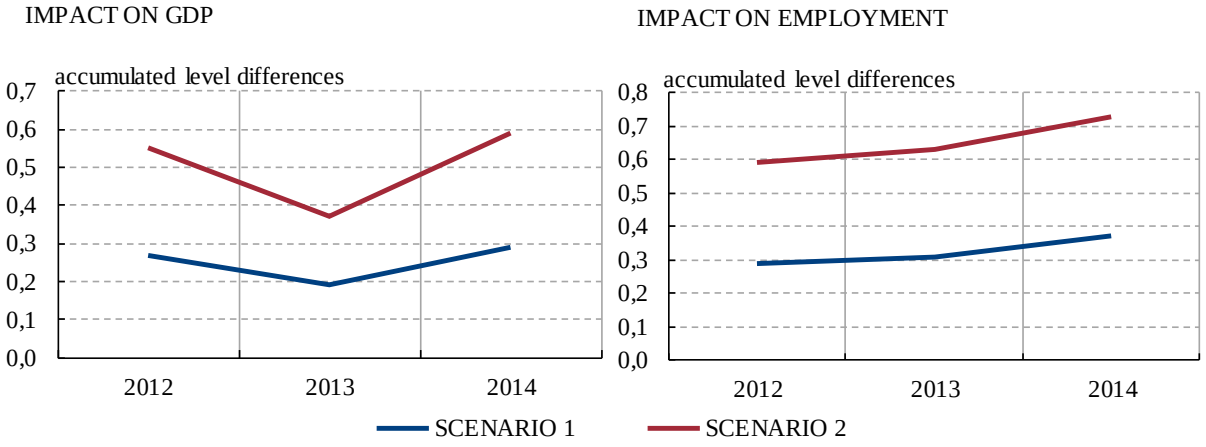
Under this first scenario it is also assumed that the main effect of the plan is to bring forward the payment of amounts which creditors of general government expected to receive late but which they had not written off. Subsequently, this assumption, which has important implications in terms of the macroeconomic effects simulated with the model, will be relaxed. Additionally, it is assumed that after the transfer relating to payment of arrears, households keep their saving rate unchanged, *i.e.* that the percentage of these payments that they save is equal to what they were saving before the transfer. This assumption, which increases the consumer response to shocks which raise disposable income, is intended to describe the situation of economic crisis in which the plan was carried out and in which agents encountered more liquidity constraints.

Figure 3.8 summarizes the estimated impact on GDP and employment for the period 2012-2014. The results obtained suggest that the supplier payment plan had a cumulative positive effect on GDP of 0.3 pp to 2014. The effect on employment was 0.4 pp. This resulted from increased consumption and, above all, from increased private productive investment. The increase in imports derived from the increase in domestic demand seems to have neutralized part of the expansionary effect of the plan.

In a second simulation (scenario 2), all the foregoing assumptions are maintained, with the difference that the impact of the plan is generated not only through the bringing-forward of the creditors' expected collection date, but also because a portion of this collection is unexpected, *i.e.* the economic agents expected that they would not collect a percentage of their trade accounts receivable from general government. An unexpected transfer from general government to private

agents naturally has a higher multiplier effect on activity. Under this scenario 2, the positive effect of the plan increases to 0.6 pp of GDP in cumulative terms to 2014 and to 0.7 pp of employment.

Figure 3.8: MTBE model: simulation of impact of the supplier payment mechanism on GDP and employment



SOURCE: Banco de España.

Table 3.3: Simulations with the quarterly macroeconometric model of Banco de España

	Scenario 1			Scenario 2		
	2012	2013	2014	2012	2013	2014
GDP	0.27	0.19	0.29	0.55	0.37	0.59
Private consumption	0.39	0.28	0.36	0.79	0.55	0.73
Gross fix capital formation	1.02	0.73	1.39	2.07	1.47	2.8
Exports	-0.01	-0.05	-0.03	-0.01	-0.10	-0.07
Imports	0.57	0.36	0.59	1.14	0.72	1.19
Employment	0.29	0.31	0.37	0.59	0.63	0.73
Consumer price index	0.04	0.09	0.07	0.08	0.18	0.15
Credit	0.13	0.38	0.56	0.26	0.75	1.12

SOURCE: Own elaboration.

In short, the above results confirm the plan's positive effects on activity, although they also illustrate the difficulty in accurately quantifying the size of these effects, given that the direct channels through which it presumably operates can only be captured imperfectly and approximately in the available macroeconomic models (*i.e.* the selected model is an appropriate tool for the calculation of how the initial increase in consumption and investment is spread to the rest of the economy through several channels, but requires all these additional assumptions in order to calculate the initial response of consumption and investment to begin with). For additional details on the effects of these policy scenarios on different macro variables, see Table 3.3.[22]

[22]In a similar exercise using the REMS model, the BBVA Research Department estimated that the impact of

3.4 Conclusions

The initiatives taken by the Spanish government as of 2012 to reduce the trade debt of regional and local governments enabled their stock of outstanding debt and the time taken to pay suppliers to be restored to normal in somewhat less than three years.

Since these mechanisms were implemented after a significant increase in regional and local government payment periods and against a background of severe economic weakness, fiscal consolidation and tight credit, they seem to have acted as a stimulus on private agents and the economy as a whole, helping to mitigate some of the adverse effects of the economic crisis. The various estimates presented in this study confirm a significant positive impact on activity, although it is complex to estimate its size accurately, given the variety of channels on which plans of this type may operate and the difficulty in capturing them with the available macroeconomic models.

As a whole, the measures implemented have proved highly effective in providing liquidity to the suppliers of local and regional government, the outstanding invoices payable of which increased significantly during the economic crisis. Simultaneously, they entailed a major increase in local and regional government indebtedness to the State. To prevent this kind of aid from generating inappropriate incentives in the behaviour of local and regional government, the financing mechanisms agreed envisage the fulfilment of adjustment plans. It is now crucial to require strict observance of those plans.

the first supplier payment plan ranged from 0.4 pp to 1 pp of GDP in the first year, depending of the use of the funds and on the percentage of constrained agents (see BBVA, 2012).

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Chapter 4

Decision making in primary debt market: empirical analysis of Spanish Regional Governments

"Markets can remain irrational
for longer than you can remain solvent"

John Maynard Keynes

4.1 Introduction

Subnational governments securities have increased both in volume and diversity over the past decades, encouraging the emergence of some studies focusing on this matter. Several factors render these assets interesting to analyse that include: the investors willingness to buy, the contagion effects from a region's possible bankruptcy, the role of the central government and the existence of a no bailout clause. In particular, Autonomous Communities' (CCAAs henceforth) market behaviour is worth studying due to their elevated market activity and the recent bailout experience of some CCAAs.

The fundamental aim for this chapter is the analysis of the CCAAs primary debt market. The analysis covers two different aspects: first, the factors that may affect securities' spreads; and second, the decision making of the CCAAs in terms of timing, quantity issued and term to maturity. CCAAs were among the most active subnational issuers in debt markets, ranking in sixth place in 2009, according to Canuto and Liu (2010b).[1] Issuance behaviour among CCAAs is very heterogeneous regarding quantity issued, frequency and international presence. Moreover, the recent economic crisis entailed strong difficulties in accessing the market and, as consequence, a new Facility was created to provide funding for the CCAAs, changing debt market behaviour.[2]

The analysis is built on all information available for all CCAAs securities issued from 1995 to 2017 and includes the information available at the moment of issuance of all indicators considered. Nevertheless, the central analysis is based on the period 1995 to 2010 to avoid the crisis distortion on debt issuance. I developed several empirical models to answer the main questions related with the issuance behaviour. In a first stage, I used an ordinary least squares (OLS) regression model to study possible determinants of spreads, considering the security characteristics and, economic and risk level indicators. In the second one, I divided the analysis in three different issues: timing, quantity issued and term to maturity. For the timing question I estimated a non-linear probit model to evaluate factors that may change the probability of issuance. For the two remaining questions, models are affected by a selection bias because both decisions, quantity issued and term to maturity of securities issued, depend on the decision of the moment of issuance. In order to cope with this problem, I estimated a Heckman selection sample model that is the most suitable to solve this methodological problem.

Some of the results are as expected. Thus, spreads appear to be higher when the amount issued is larger, when sovereign risk and markets spreads rise, when economic situation and CCAAs worsens and when the security is issued in a foreign currency. Possibly, the most interesting results is that CCAAs seem to optimise their issuance strategy, taking into account

[1] They ranked sixth after United States, Germany, Japan, Canada and China. Annex C presents an international comparison of subnational issuances and a description of several kinds of cooperation among different level of government to resort to the market.

[2] This Facility reduced the need to resort to the market changing therefore the Spanish subnational debt landscape. The Financial Liquidity Fund (FLA) was created in 2012. Annex B provides a detailed description of the central government Funds and the crisis impact on CCAAs issuance behaviour.

their financing needs, their economic situation, the behaviour of other competitors and the structure of their debt, whereas spreads seem to have a weak role in the whole process. The lack of effect of spreads over the issuance behaviour may indicate some sort of malfunctioning in the market due to existent bureaucratic rigidities. Nevertheless, the data may also have some flaws that may distort the estimation results. Finally, the amounts received from the central government through the FLA have discourage the issuance of debt, and thus a debate is still pending about the role of this facility and the optimal time to return to the markets.

Most studies focused on the analysis of spreads evolution and the effect of possible bailouts and some of them develop a cross-country comparison. For instance, Beck et al. (2017) examined the existence of a credible no bailout clause, finding that the link between spreads evolutions and expected fundamentals is weaker when the clause is not credible. Some studies used data on both primary and secondary market for numerous countries (see Jenkner & Lu, 2014; Schuknecht et al., 2009). While other studies focus on the analysis of a single country, generally a federal one. For instance, Feld et al. (2013) evaluate the Swiss Cantons yield spreads studying the particular role of fiscal rules and no bail-clause. Looking at the Canadian subnational debt market, Booth et al. (2007) studied Canadian Provinces' spreads behaviour. Building on this literature, this chapter goes beyond and focuses on a different aspect of subnational securities, the issuance decision.

This chapter is organized as follows. First, in section 4.2 there is a description of the main characters of the CCAAs' debt market. Second, section 4.3 describes the models proposed. Third, section 4.4 contains a detailed description of the data included in this research. Fourth, the main empirical results appear in section 4.5. Finally, in section 4.6 some conclusions are provided.

4.2 The Autonomous Communities' primary debt market

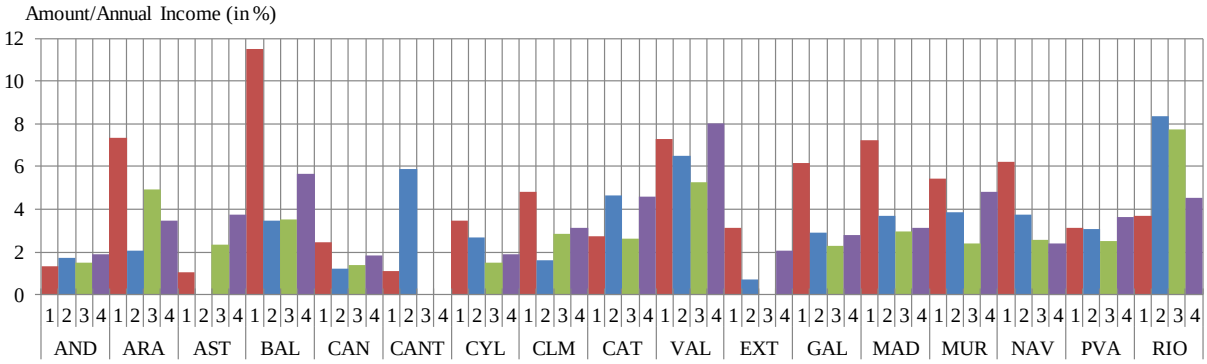
The Organic Law on the Financing of the Autonomous Regions (LOFCA) articulates the power of CCAA to issue debt.[3] Yet, CCAAs require prior authorization from the central government. This requirement has a direct impact on the CCAAs' issuance behaviour, subduing the issuance timing. The amount of debt issued quarterly is shown in figure 4.1. CCAAs tend to issue more debt in the first quarter, followed by the fourth an second. This time profile may be explained by the process of issuance authorisation. Generally, in the beginning of the year, the central government grants the authorization to issue the debt necessary to cover the deficit target and the maturities. Additional authorisations may be granted.

From 1995 to 2009, the presence of the CCAAs in debt markets was relatively stable (see figure 4.2). Nevertheless, the recent economic crisis had a direct impact on the CCAAs' market activity. In the middle of the debt crisis, CCAAs needed extra funding for their soaring

[3]This law follows the Article 157 of the Spanish Constitution prescription, which establishes that the CCAAs may finance themselves with debt.

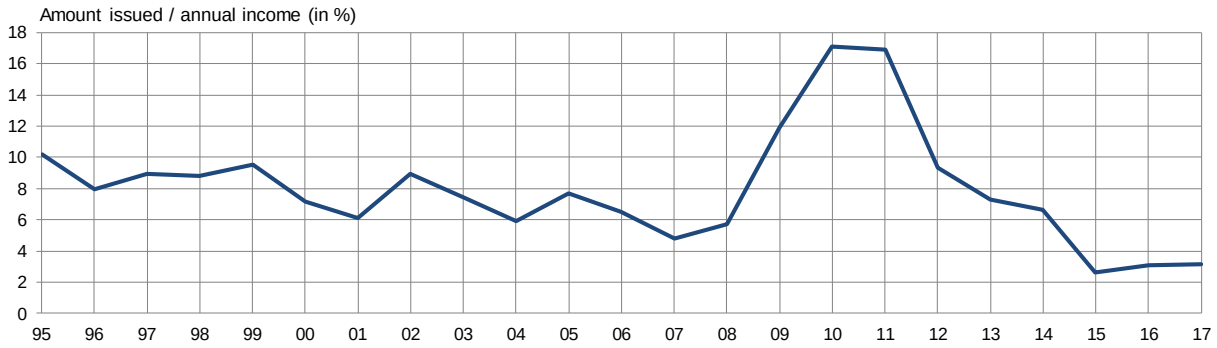
deficits. They sought financing in debt markets, reaching a historical peak in 2010. However, the increasing cost of financing in markets hampered the fiscal sustainability of some CCAAs. In order to prevent any risk of bankruptcy for the CCAAs, the central government set up a Fund to ensure financing for the CCAAs. This fund reduced their incentive to resorting to debt markets. Following this measure, there was a steep reduction of annual issuances in the market, that extended to 2015. In the last two years of the period of to study (1995-2017), the amount issued has recovered slightly.

Figure 4.1: Average quarterly amount of securities issued by CCAA (as a percentage of annual regional income)



SOURCE: Banco de España, General Intervention Board of the State Administration, own elaboration.
AND=Andalusia; ARA=Aragon; AST=Asturias; BAL=Balearic Islands; CAN= Canary Islands; CANT=Cantabria; CAT=Catalonia; CL=Castilla and Leon; CM=Castilla la Mancha; EXT=Extremadrua; GAL=Galica; MAD=Madrid; MUR=Murcia; NAV=Navarra; PV=Basque Country; RIO=Rioja; VAL=Valencia.

Figure 4.2: Amount of securities issued by regional subsector (as a percentage of annual regional income)



SOURCE: Banco de España, General Intervention Board of the State Administration, own elaboration.

Therefore, the recent economic crisis transformed drastically the CCAAs' debt market. At the core of the debt crisis, investors were not keen to buy Spanish regional debt, as it was perceived as risky due to the large fiscal imbalances accumulated. The cost of financing increased rapidly. To cope with this illiquidity problem, the central government created the Autonomous Liquidity Fund (FLA), which was a fund that settled CCAAs' maturities and interest coupons

transforming securities and bank loans into loans with the central government.[4] Thus, CCAAs' did not need to issue new debt to obtain financing. This fund was voluntary and it implied a reinforced control over CCAAs. Some of the CCAAs that entered the fund stopped issuing debt some years later (such as Catalonia and Valencia) and others reduced drastically the amount issued. Other CCAAs decided not to join and even increased drastically the amount issued (*e.g.* Madrid) taking advantage of low market interest rates, partially due to the loosening in ECB monetary policy.

In recent years, the central government has focused more intensively on the sustainability of CCAAs' finances. In June 2015, a new law added an article to the LOFCA including the Financial Prudence Principle.[5] This principle implies a maximum spread for the CCAAs securities over central government ones. This limit is now determined by the General Secretariat of the Treasury and Financial Policy. Thus, by imposing a limit to their issuance activity, CCAAs can only issue if the cost in the market is lower than the maximum determined by the Treasury.[6]

Finally, CCAAs are very heterogeneous in different aspects: size, economic structure or even culture. The funding strategy is not an exception. Hence, some CCAAs have relied more on loans while others have been very active in national and even international debt market. This diversity is shown in the figure 4.3 where three CCAAs stand out: Andalusia, Catalonia and Valencia. These three CCAAs have been highly active in the markets up to 2014, with a regular agenda of issuance and with international market issuance programmes. As explained by Jannone Bellot et al. (2017), these three CCAAs had a Euro Medium Term Notes (EMTN) programme. In the case of Valencia it dates from 1998, and in the case of Catalonia and Andalusia from 2009. Valencia also has a Euro-Commercial Papers (ECP) since 1993 and Catalonia since 2010.[7] Meanwhile, other CCAAs started to issued again (Asturias) or significantly increased their activity (*e.g.* Madrid) after the crisis.[8] For a more detailed analysis of the CCAAs issuance evolution see Annex B.

4.3 Model specification

This sections describes the empirical strategy of this chapter. The approach is based on 2 stages: First I analyse the spreads behaviour that corroborates results found in the literature. Next, I evaluate the choice of issuance. This choice has two parts: first the timing decision and second the quantity and the term to maturity decisions.

[4]For a more detailed description see Annex B. This fund was transformed into the current "regional financing fund".

[5]Organic Law 6/2015 article 1.2.

[6]In its resolution of the 4^{th} of July 2017, the Treasury fixed a maximum spread of 50 basis points

[7]These are programmes of debt issuance in the Euromarket. These programmes are currently on hold, until these CCAAs regain a normal issuance activity. The description of these programmes is still available for instance in the Instituto Valenciano de Finanzas.web page.

[8]Asturias issued some debt back in the 1980's.

4.3.1 Spreads evolution

I begin with the study of the main determinants of the individual cost of financing, that is measured as the internal rate of return (IRR).[9] In order to have a comparable variable, spreads of each security are calculated as the difference between the IRR of each security and the secondary market interest rate of the central government securities with equivalent term to maturity. The reasoning behind this specification is that an investor that would be interested in buying CCAAs' securities would compare it to an equivalent security of the central government in the secondary market.[10]

Investors may buy CCAAs' securities for two main reasons: higher yields and a portfolio diversification strategy. Thus, the demand of a specific security (B_t^D) depends mainly on the yield of the security (i_t^b) positively, and negatively on the yield of an equivalent security (i_t^*),[11] and on the risk of non-payment: B_t^D ($\overset{+}{i_t^b}$; $\overset{-}{i_t^*}$; $\overset{-}{non-payment\ risk}$).

Therefore, the yield required by an investor to buy a certain security is higher the larger the yields of other CCAAs' securities and the stronger the repayment risk. The model of spreads analysis is represented by equation 4.1:

$$S_k^{i,t} = \alpha\ Q_k + \beta\ tm_k + \eta\ cr_k + \gamma\ PR_t + \sum_{j \neq i} \sum_{\substack{T= \\ t-15}}^{t+15} \upsilon_{j,T} S_{j,T} + \mu\ \Omega_{i,t} + \epsilon_k^{i,t} \tag{4.1}$$

where the spreads of a specific security k of the CCAA i, at a specific day t ($S_k^{i,t}$), depend on the amount issued of that security (Q_k^i), its term to maturity (tm_k), the currency of issuance (cr_k), the sovereign risk premium at the moment of issuance (PR_t), the spreads of others CCAAs ($S_{j,T}$) over the previous and following 15 days,[12] and some economic indicators for the CCAA i at the moment of issuance (Ω_{it}).

4.3.2 Issuance decision

Having established a relationship between spreads and the economic fundamentals, I now focus on the decision making process. Issuance depends mainly on CCAAs financing needs that comprise deficit (Def_t), corrected by the net variation of real assets (ΔRA_t), and of loan

[9] Internal rate of return is a discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero. IRR calculations rely on the same formula as NPV does. $NPV = \sum_{t-1}^{T} \frac{C_t}{(1+r)^t} - C_0$, where C_t is the net cash inflow during period t, C_0 is the total initial investment cost, r is the discount rate, and t is the number of periods. Thus, the IRR is the r that renders NPV equal zero.

[10] The reason for the election of the secondary market data for the central securities is twofold. First, data are available for every day of the period examined while the primary market data is only available in the day of issuance. Second, due to the contemporary substitutability, an investor can buy securities from CCAAs or central government in the secondary market on the same day.

[11] Where an equivalent investment is defined as the securities issued by the other CCAAs.

[12] The election of a time range of 15 days is due to the low frequency of issuances. Thus a month around the issuance date seems reasonable.

(ΔLM_t) and securities maturities (ΔSM_t):

$$FN_t = Def_t - \Delta RA_t + \Delta LM_t + \Delta SM_t \tag{4.2}$$

CCAAs decide their funding strategy, by deciding between issuing debt or applying for a bank loan. Furthermore, a CCAA must decide the weight of loans and securities over total debt as well as the temporary structure of its debt. For small CCAAs it is harder to enter the debt market as there is a fix cost of entry. Thus, it is not surprising that the biggest and wealthiest CCAAs are the ones that have issued more debt over the past 30 years. Once the CCAA has entered the debt market, it is easier to continue issuing debt. Thus, each CCAA would issue securities to cover its financing needs net of the change in Loans Stocks:

$$New\ Securities_{it} = Deficit_{it} + Maturities_{it} - \Delta Stock\ Loans_{it} \tag{4.3}$$

There are three main decisions a CCAA confronts once it is in the market that include: when to issue, the amount issued and the term to maturity. For the first decision I estimated a non-linear model of the probability of issuance (Probit), while for the 2^{nd} and 3^{rd} I employed a Heckman Sample selection model.

4.3.2.1 Timing Decision: Probit Model

CCAAs consider various factors when deciding to issue new securities in the market. First, they have to choose the specific moment to resort to the market. A CCAA needs an authorization from the central government for issuing new debt in the markets. Generally, the central government gives the authorization with a validity up to the end of December of each year. Nevertheless, if the authorization is approved near the end of the year, it may be valid up to the first months of the following year. The CCAA may need various authorizations over the year, thus making it more difficult to choose the optimal portfolio strategy.

The probability of issuance is analysed by the estimation of a probit model (Bliss, 1934). It is based on the existence of a latent variable y_i^* that follows $y_i^* = x_i\Theta + e_i$ where e_i is independent of the explanatory variables x_i and e_i $Normal(0,1)$. But y_i^* is not observable, rather y_i is as follows:

$$y_t = \begin{cases} 1\ if\ y_t^* > 0 \\ 0\ if\ y_t^* \leq 0 \end{cases} \tag{4.4}$$

The target of this model is to calculate the impact of the explanatory variables on the probability of issuance. y_t is a dummy variable that takes value equal 1 when the CCAA issues a security and zero otherwise. The probability of issuance is then:

$$P(y_i = 1|x_i) = P(y_i^* > 0 \mid x_i) = P(x_i\theta + e_i > 0 \mid x_i) = \Phi(x_i\theta) \tag{4.5}$$

where Φ is the standard normal cumulative distribution function. Therefore, the probability

of non issuance is $P(y_i = 0|x_i) = 1 - \Phi(x_i\theta)$.[13]

The main hypotheses tested with this model are the following: first, the probability of issuance is expected to depend positively on the financing needs (amount of deficit and maturities); second, the probability of issuance should be affected by the behaviour of other CCAAs and the central government in the debt market; third, it would be expected to depend negatively on the evolution of the cost of financing in the market; and, finally, it would depend on the economic situation of the CCAA, as it would affect the market access. For the quarterly model, I included dummies for the quarters (for the first, second and fourth quarter as the CCAAs issue more debt in those three quarters).[14]

4.3.2.2 Amount and maturity structure decisions: Heckman Correction Model

The other two decisions the CCAA has to make, that are consecutive to the timing decision, are how much to issue and at what term to maturity. Both decisions are analysed through a Heckman selection model. Heckman developed a new approach for the sample selection bias in Heckman (1979). The main idea underlying the Heckman model is that previous decisions taken by the CCAA can render the sample biased and hence violate the assumption of random sampling. The model is specified as:

$$E(y_1|x, y_2 = 1) = x_1\beta_1 + \gamma_1\lambda\ (x\delta_2) \tag{4.6}$$

where the dependent variable y_1 is only observable when y_2 is equal to 1, being y_1 the amount issued and y_2 the binary variable of issuance. λ is the inverse Mills ratio defined as: $\lambda(\cdot) = \frac{\phi(\cdot)}{1-\Phi(\cdot)}$, where ϕ and Φ are, respectively, the density and distribution function of a standard normal variable. If γ_1 is equal to zero, the sample would be unbiased, and an OLS model would produce a consistent estimator of β_1. On the other hand, if γ_1 is different from zero, then the sample is biased, and the OLS model would omit the $\gamma_1\lambda\ (x\delta_2)$ term, producing an inconsistent estimator of β_1.

The Heckman model is calculated in two consecutive steps: in the first one, a probit model is estimated to obtain $\hat{\delta_2}$.[15] After the corresponding inverse Mills ratio is obtained ($\hat{\lambda_{i2}}$), $\hat{\beta_1}$ and $\hat{\gamma_1}$ are calculated via an OLS regression model on the selected sample.

For the estimation of the Heckman selection model, I chose a $\mathbf{x}$ vector different from the x_1.[16] Thus, for the probit stage, the variables used are the ones included in the last column of tables 4.5 or 4.8 depending on the frequency of the model. Basically, the probit model used is the simplest version of the probits constructed, that does not lose its explanatory power. The variables chosen would affect the timing decision and not the amount.

[13]The density function for y_i given x_i would be $f(y|x_i = [\Phi(x_i\theta)]^y[1 - \Phi(x_i\theta)]^{1-y}, \quad y = 0,\ 1.$

[14]Section 4.5.2 expands this analysis using daily and quarterly data.

[15]By estimating the probit model $P(y_{i2} = 1|x_i) = \Phi(x_i\delta_2)$.

[16]If $x_i = \mathbf{x}$, the collinearity among the regressors in equation 4.6 would lead to large standard errors of the elements of $\hat{\beta_1}$.

The underlying question in the analysis is whether the CCAAs have followed a specific issuance strategy. Hildreth (1993) provides a list of incentives and disincentives to issue. On the incentives side, a sub-national government would borrow because of its financing needs but also because of the political agendas and the exploitation of capital markets opportunities. For instance, a government would have incentives to issue new debt for financing investment projects, that would be paid by future governments. The disincentives are mainly driven by legal, political and economic factors. Thus legal limits to the level of debt, the voters disapproval of debt surge and the increase in market cost would generally disincentive new issues. Thus, CCAAs would try to reduce costs of financing by issuing when the spreads and the risk premium are lower.

The model includes as controls the financing needs, the behaviour of other CCAAs and the central government, the cost of financing, the level of debt and some economic indicators. The probit phase of the model is constructed as a simplified model of the section 4.3.2.1, including only the factors that account for most of the variability of the probit model.[17] In order to differentiate the probit estimator and the Heckman one, the probit estimators includes the number of issuances of other governments and the number of maturities, while the Heckman uses the amounts of this variables. The justification for this choice lies on the expected behaviour of the CCAAs that would focus more in the moment other CCAAs resort to the market, than the amount issued by those CCAAs.

The Heckman models estimated test the relation of the quantity issued with respect to the financing needs, the behaviour of competitor governments, the cost of financing, and the economic situation.

Finally, the third important issue related with market behaviour of the CCAAs is the temporal structure of the debt issued. The CCAA may choose to issue short, medium or long-term debt. The optimal temporal structure depends on the CCAA government and the economic situation. Alfaro and Kanczuk (2009) analyse the main arguments in favour and against the short/long term decision. On the one hand, short term liabilities magnify financial vulnerability, as CCAAs face significant needs of new funding more frequently. There are two negative consequences associated with this namely: first, a sudden surge of interest rates would enlarge the cost of financing as the CCAA must refinance a portion of its debt; second, the probability of debt crisis appears to increase the shorter and more concentrated the debt maturity. On the other hand, the CCAA would most commonly have to pay a premium for the long term maturity, depending on the liquidity and on the expectation of repayment.

A second Heckman sample selection model specification is used to study the term to maturity measured in years. Unlike former models, this model tests whether the decision of the term to maturity is associated with the interest curve. The remaining explanatory variables are the same as in the amount decision model.

[17] The probit model only includes the number of other CCAAs days of issuances, the number of maturities, the stock of central government loans, and the IPI growth. With these four variable the R-squared is almost similar to the most complex probit model.

4.4 Data description

This study takes into account the information of the securities issued by the CCAA from 1995 to 2017. Although, CCAA have issued securities since the 1980's, the information published by the official bulletins and other sources of information is not always available. Moreover, most of the regional economic indicators are only available from 1995 onwards. To take into account the usual CCAAs' issuance behaviour, the main models only include the period 1995 to 2010, to extract the effect of the bail out on the issuance behaviour. Nevertheless, Annex D includes all estimations for the whole period available.

A description of the sources of data used in the analysis is available in table 4.1. I constructed three different databases from the individual data of securities that are used in different stages of the analysis. The first database has as dependent variable the spreads categorized by term to maturity and currency. The second and third databases have the same dependent variables, the quantity issue and the term to maturity of the securities issued in the specific period. The only difference between them is the frequency of the data (daily or quarterly). In the case of the daily database, the number of observations is lower than the total securities issued daily because the CCAAs sometimes issue more than one security per day.

Table 4.1: Databases description: 1995-2010

Main variable	Spreads	Quantities	Quantities
Total number of observations	5,738	99,348	1,088
Non-zero observations	5,738	2,699	368
Frequency	Not applicable	Daily	Quarterly
Description of the dependent variable	Spreads by term to maturity and currency	Three main variables: - Dummy variable = 1 when amount issued is positive and zero otherwise - Amount over income (with zeros when no issues) - Average maturity: Number of years.	

Starting with the spreads database, from the 6924 securities issued between 1995 and 2017 classified by term to maturity and currency (national or foreigner), only 5738 of those securities have a known spread.[18] In some cases the primary market price is not available in the sources consulted. In others, the spread resulting is unreasonable high or low, and it creates doubts of its validity for analysis purposes. Thus a limit of minus 50 and plus 250 basis points has been established to eliminate the outliers. The maximum spread is determined by the spread of the securities in the middle of the crisis prior to the creation of the FLA, while the minimum comprises the vast majority of spreads and it seems very unreasonable that securities from regions with lower rating would have a lower IRR than the central government.[19]

[18] Between 1995 and 2010 there were 6,197 issues, 4,787 with a known spread.

[19] Only two CCAA have historically better rating than the central government: Navarre and Basque Country, as shown by Canuto and Liu (2013). Those two CCAA have not being very active in the markets over the whole

The second database includes the amount of securities issued daily by each CCAA. Over the whole period (142,817 observations) there has only been 3410 in which there is a positive amount issued. An the third data bases replicates this second one but with a quarterly temporary frequency. In this database, from the 1564 observations, there are only 552 that are positive.[20]

As mention before, there are significant differences among CCAA. There are three CCAA that stand out: Andalusia, Catalonia and Valencia. These three CCAA have issued securities regularly, thus they have issued between 1000 and 2500 securities over this period. The rest of the CCAA have issued far less, being Madrid the next Autonomous Community that has issued the most.

All these three databases have similar indicators that are the ones that were available in the moment of the issuance. As shown in table 4.2, all indicators used are available with a specific delay. For instance, regional GDP is only available annually and the data for one year is available the next year at the end of march. Thus, in January 2017, the GDP used is the one of 2015 and in April 2017 the GDP used is the one belonging to 2016.

Table 4.2: Indicators Timetable

	Source	Freq (a)	Date	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
GDP	INE	Y	March 30th	Y-2			Y-1								
Budgetary Balance	IGAE	Y	March 30th	Y-2			Y-1								
Debt	BDE	Q	15th/30th	Q3 Y-1			Q4 Y-1		Q1				Q2		Q3
EPA	INE	Q	25th	Q3 Y-1	Q4 Y-1			Q1			Q2			Q3	
IPI	INE	M	8th	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct
Rating		D		Composite index, calculated from the rating of the Rating agencies: Fitch, Moody's, S&P											
Risk Premia	Bloom-berg	D		Difference between yield of the 10 year bond for Spain and for Germany											

a. Y stands for yearly, Q for Quarterly, M for Monthly and D for Daily

The main indicators used in the models specification can be classified in five categories: the need of funding, the behaviour of other CCAAs and the central government, the cost of financing, the structure of debt, the economic indicators.

The need of funding category is formed by the maturities in the period,[21] the deficit in the previous year and the variation of the stock of loans in percent of GDP. For the daily analysis, the amount of maturities is the sum of maturities over the next thirty days following the issuance.[22] The use of deficit in the previous year is because at the moment of issuance, the only available data is the execution of deficit in the previous year or the budgetary deficit for the current one. Nevertheless, the difference between the budgetary data and the final execution is generally significant. For the analysis of the issuance decision, the relevant data is the execution one.

period.

[20] The summary statistics are provided in table D.9 and table D.10.

[21] In percentage of the last available annual revenues.

[22] A CCAA is expected to be forward looking and would issue debt to face coming maturities. In the quarterly model, the CCAA would take into account the maturities of that specific quarter.

The second category includes the issuances made by other CCAAs and the central government. It includes both the number of issuances and the amount issued over the last known annual revenues. In the daily estimations, the total amount issued by the central government is the sum of the amount issued in the five previous and following days from the specific date. Whereas the total amount issued by the CCAAs correspond to the period of minus/plus ten days from the specific date.

Third, the cost of financing category contains the sovereign risk premium, the spreads, and the interest curve. The sovereign risk premium is derived from Reuters data, and is defined as the difference between the ten year bond secondary market yield of Spain and Germany. The spreads of other CCAAs are used in the spreads estimations. It is calculated as the average of the spreads of all CCAAs in a period of plus/minus fifteen days. On the other hand, the spreads variable used in the decision models is the average of the spreads of all CCAA as a CCAA would analyse its own spreads and the rest of the CCAAs spreads at the moment of issuance. Finally, the interest curve is the central government interest difference between the ten year bond and the three month treasury bill in the secondary market.

Fourth, the CCAA's debt structure category encompasses the level of debt, the amount of funds received from the central government (since the creation of the FLA in 2012), the stock of loans (net of the central government ones) and the stock of securities. All these variables are published quarterly by Banco de España, and are in terms of the regional GDP.

Fifth, the economic indicators are all estimated by the National Bureau of Statistics (INE). The indicators included are the Industrial Production Index (a monthly indicator), the Labour Force Survey (EPA) (a quarterly indicator), Annual regional GDP growth, and Quarterly national GDP growth.

4.5 Results

This section focuses on the results of the models described in section 4.3. It is divided in two parts: first the spreads behaviour in section 4.5.1 and second, the three main decisions of the issuance process in section 4.5.2. The estimation results for all models are shown in tables 4.3 to 4.10.

4.5.1 Spreads analysis

The spreads analysis tests the hypotheses described in section 4.3.1 through an OLS model. Table 4.3 shows the main results for the 1995-2010 period, considering the spreads as a hundred basis points measure. Results are quite similar for the 1995-2010 that for the whole period available.[23] The factors considered are divided into three categories: first, the characteristics of the security, *i.e.* the amount issued, the term to maturity, and the currency; second, other

[23]Table D.1 shows the results for the whole period.

measures of risk in the market, *i.e.* the sovereign risk premium and the spreads of other CCAAs' securities issued near; and third, the economic situation of the CCAA, that includes the level of debt, of funds received from the central government, of deficit, the ratings, the change in unemployment and the IPI and regional GDP growth. For robustness of the main results, three different specification are shown in table 4.3. The difference among them is the inclusion of some specific variables that may distort the estimation results: ratings and issuance currency. Ratings are extremely stable until the beginning of crisis, and issuance currency is a dummy that takes in most cases a value equal 1. Specific OLS models are estimated for the three most active CCAAs in the market: Andalusia, Catalonia and Valencia.

The characteristics of the security issued are an essential element of the spreads evolution. The higher the amount issued the larger the spreads, as the risk of non-payment would increase as benefits from bankruptcy would be larger. The impact of term to maturity is inversely related to the spreads so that there are higher spreads for short term debt. This result is puzzling because it is expected that the longer the term to maturity the less probable would be the payment. Nevertheless, some studies have argued that this behaviour is not uncommon. Sometimes, investors perceived long term debt as less risky because bailout may seem more probable in the long term, and because even if a CCAA has a worse economic situation in the present, it may recover in the future (see Alfaro and Kanczuk (2009)). This result is also obtained in previous studies such as Beck et al. (2017) in which secondary market spreads depend negatively on the term to maturity. Other possible explanation is related with the underlying variable, the rate of return of the State Securities. As the term to maturity rises, so would the rate of return. Thus, the spread of the CCAAs' securities could be larger in good than in bad times. Securities' spreads also seem to depend on the currency they are issued in, being costlier to issue in a foreign currency than in a national one.

Sovereign risk premium and other CCAAs' spreads are a consistent indicator of spreads increases. Both variables are a proxy of the risk perception in the debt market. When investors perceive a surge in debt market risk, the risk premium rises. The impact is higher for the spreads of other CCAAs than for the risk premium, as an increase of 1 perceptual point in other CCAAs spreads entail a surge of around 0.6 pp the spread of the CCAA, while the same increase in the risk premium implies a rise of near 0.1 pp. In a risk aversion environment, investors would probably buy the less risky assets, that in this case would be the central government bond, pushing upwards the cost of the sub-national government securities (*i.e.* the spreads). Although this relation may be bidirectional, as Jenkner and Lu (2014) show that the impact the funds created by the central government to help the CCAAs under fiscal distress had affected Spain's credit risk premium. Finally, the relation among spreads of the CCAAs shown a sort of co-movement of the spreads that could implied that investors consider CCAAs' securities as complementary, and demand them equally following a portfolio diversification strategy.

Economic indicators have a significant relation with the spreads. The higher the debt level, the lower the ratings and the better the economic situation (*i.e.* the larger the IPI and GDP growth and the smaller the unemployment variation), the smaller the spreads are. These vari-

ables represent the economic vulnerability as, for instance, the higher the debt, the stronger the probability of default. A CCAA will take advantage of the additional liquidity of the non-payment the larger the amount of debt owed. The only puzzling result is the sign of the budgetary balance implying that a better fiscal situation increase spreads. Nevertheless, the budgetary balance has not historically been publicly accessible. The transparency of regional data has emerged after the crisis, and this may explain the apparently counter-intuitive result of this particular coefficient.

The central government funds have a positive effect on spreads, due to an increase of central government financing cost, or a decrease of the regions' one.[24] As explained before, the bailout may increase the cost of financing of the higher lever administration. Meanwhile, investors consider a sudden drop of bankruptcy probability thanks to the bailout.

Finally, it is worth noticing that these results are not as strong in a disaggregated perspective because only the amount issued, and the spreads of other CCAAs are consistent and significant with the aggregated results. In conclusion, the spreads seem to follow more or less the expected behaviour and thus they can be used as a reliant explanatory variable of the following decision models.

In conclusion, spreads depend essentially on the investors risk perception of security, which consider the characteristics of the security, debt market and economic situation of the CCAA when assessing this risk.

4.5.2 Issuance Decisions

This section focuses on the three main issuance decisions models: timing, amount and term to maturity. Tables 4.5 to 4.10 show the main estimation results for the daily and quarterly models and 4.4 encompasses a summary of the main results of the models estimated. The first important remark is that the parameter estimations are sometimes very small, specially in the daily probit model due to the reduced probability of issuance. This probability is just 2.7% in the daily model as there are only issuances in 2,699 days, while the probability rises for the quarterly model to near than 34%, because the CCAAs issue in 368 quarters over the 1,088 quarters studied.[25]

The three financing need components seem crucial in the CCAAs market behaviour. As expected, a fundamental factor underlying the three issuance decisions seems to be the number and amounts of maturities in the period, with an estimated positive impact for the three questions, meaning that the larger the maturities, the most probable is that a CCAA would resort to the market, with a higher amount and at a larger term to maturity (see tables 4.5 and 4.8 for the timing decision (daily and quarterly)), 4.6 and 4.9 for the amount and 4.7 and

[24] Delgado and Pérez (2018) develops an extensive description of the evolution of these funds and the effect on CCAAs' securities.

[25] In this calculation the total amount is the result of the 17 CCAAs times the 64 quarters studied, from the 1^{st} quarter of 1995 to the 4^{rd} quarter of 2010. Probabilities are similar for the period 1995-2017.

4.10 for the term to maturity decision).[26] The opposite impact appear to exert the variation of the loans, following its substitutive role in the financing, although it is only significant for the timing decision.[27] An increase in the stock of total loans would reduce the probability of issuance. Finally, the budgetary balance effect on issuances is not clear. On the one side, a fiscal deficit seems to discourage the number of times issued, but encourage the amount and the length of the term to maturity. This variable encompass two opposing effects rendering the effect on the market activity far from clear. Firstly, a bigger deficit increases financing needs. Secondly, market financing costs would rise in the presence of unhealthy fiscal accounts.

CCAAs consider the activity of market competitors when acting in the debt market. An increase in number of issuance and in amount issued by other CCAAs has a positive impact on the probability, amount and term to maturity. One possible explanation for this behaviour is based on the idea that investors consider securities issued by different public actors as complementary and, they would buy different CCAAs' securities following a portfolio diversification strategy.[28] If a CCAAs knows there is not a real competition with other CCAAs, it would have incentives to resort to the market when it seems a good moment to do so. It would follow market results of other governments issuances. Thus, the probability and the amount issued and even the term to maturity would increase in parallel to the activity of other governments in the market. Meanwhile, Central Government issuances seem to only affect the term to maturity and in the opposite direction.[29]

Financing cost effect does not seem conclusive. The combination of the premium risk and the spreads seem to counterbalance both for the timing and the amount models. The only conclusive results is the effect of the interest curve seems that reduces the securities' term to maturity as expected.

Debt level and its structure appear to affect the issuance decisions process. The higher the debt level, the higher the probability of issuance, but lower the term to maturity of the securities issued.[30] A significant level of debt would increase the cost of market financing, and the CCAA would find it difficult to issue at a reasonable cost, especially in the long term. Nevertheless, the increase in costs would depend on the existence of a credible no bailout clause. If this clause is not credible, the cost would be subdued, as investors would expect the central government to rescue the CCAA. As mentioned in section 4.5.1, the link between spreads of sub-national debt and its economic fundamentals are weaker when the bailout is expected. The composition has a coherent estimated impact with an opposing effect of loans and securities stocks over the amount issued. Thus, and increase in securities and a decrease of loans stocks would decrease the amount of new securities. It seems that CCAAs tend to equilibrate their two sources of financing to maintain their weight more or less stable, as has been common over the whole

[26] Nevertheless, this last result only holds in the daily model.
[27] In the estimations for the whole period, this variable is significant for all decisions.
[28] This could be true only if investors have not reached a maximum desirable stock of Spanish securities.
[29] This result must be taken with caution as the model for the whole period seems to have a different effect.
[30] The effect on the amount issued is not clear.

period (see Delgado and Pérez (2018)). In the longer period analysis, the Central Government funds that have a negative impact on the three decisions, as CCAAs that entered the facility have reduced and even stop all market activity.

Finally, strong economic growth measured by the IPI reduces slightly the probability of issuance, as financing needs are smaller. Nevertheless, the opposite would have been acceptable, as a region with higher economic growth would be better perceived by investors and, therefore, financing would be easier.

In conclusion, CCAAs consider numerous factors when resorting to the market. They try to optimise its issuance strategy, taking in account their financing needs, their economic situation, the behaviour of other competitors and the structure of their debt.

4.6 Conclusions

In this chapter, I have analysed the different aspects that may affect the process of the issuance decision taken by the Spanish regional governments. The analysis has been twofold: first an analysis of regional bond spreads determinants, and second a more complex analysis of the three main decision of the issuance process.

The CCAAs have been fairly active in the debt markets over the last 22 years. Nevertheless, the issuance behaviour has not been homogeneous among regions, with three CCAAs outstanding the others (Andalusia, Catalonia and Valencia). Also, the economic crisis changed the issuance panorama with the exit of Catalonia and Valencia from the market, while other CCAAs have even increased their activity (*e.g.* Madrid). This heterogeneity boosts the interest for sub-national debt market functioning.

The results from the empirical analysis show that spreads follow an expected behaviour with respect to the securities characteristic, the risk perception in the market and the economic situation of the CCAAs. Therefore it seems that investors take into account most of the information available when buying CCAAs securities. One surprising result is the effect that central government funds have over the spreads of the recipient CCAAs. Interestingly, it seems that spreads were lower, the larger the funds received are. This could be explained by the change in issuance behaviour, as theses CCAAs reduced the term to maturity and amount issued and, consequently spreads fell. In addition, the bailout reduced significantly the risk of non-payment. Thus, investors did not punish specifically the CCAAs that entered the FLA.

The second main result of the analysis is that CCAAs seem to issue debt when needed because of upcoming maturities. Also, they tend to resort to the market more when there is more market activity, but they do not specifically take into account the evolution of the cost of financing. This last result may be related with the bureaucratic requirements that may impede the optimisation of the issuance strategy. There are some rigidities in the process such as the prior authorisation needed that may prevent the optimisation of the process. Nevertheless, these legal restrictions are needed now more than ever, as the no bailout clause has been factually elimi-

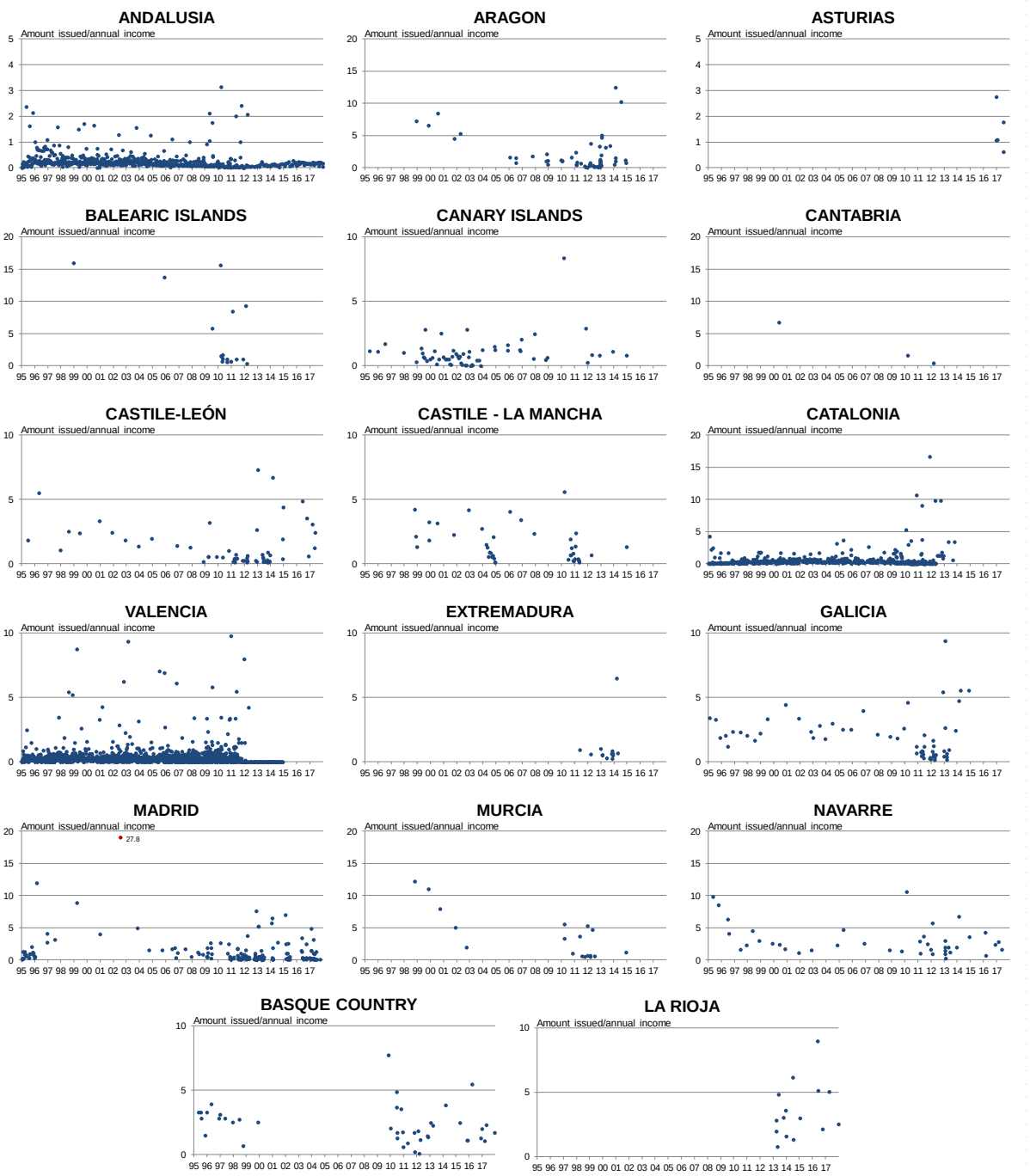
nated. Spain governments should rethink the best possible system to ensure CCAAs financing while discouraging moral hazard problems.

Finally, Spain needs a comprehensive debate about the existence of a no bailout clause and the compatibility with a financial facility (such as the FFCCAA). Restoring a credible clause is not an easy task, and it will require an effort for increasing the reinforcement of existent and future laws. The main question is whether the central government would let a region to go bankrupt, considering the plausible political and economic consequences. If the central government is more likely to rescue the CCAA, then the system should be reform to establish forehand the specific procedure to follow in a liquidity or in a solvency crises.

A second question that deserves further analysis is the optimal timing for the return to the market of the CCAAs that have stopped their activity. The economic situation and the stock of debt are going to be essential in the cost CCAAs will find for new issuances. After several years of strong economic growth it seems a good moment to start again issuing debt, specially if we take into account, as Cantalapiedra and Jiménez (2017) point out, that market interests rates are at a historical minimum.

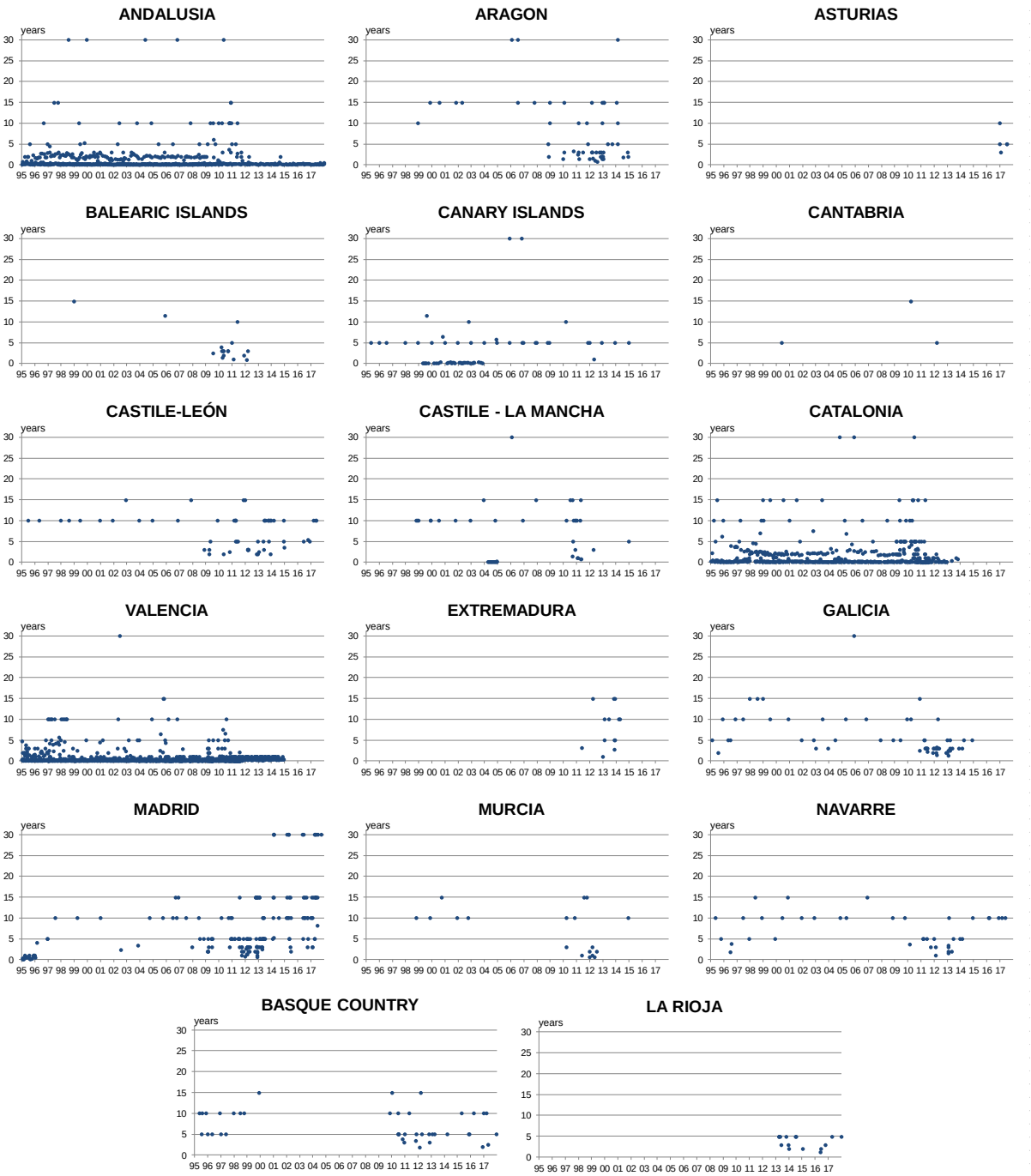
4.7 Figures and Tables

Figure 4.3: Amount of securities issued by regional government (as a percentage of annual regional income)



SOURCE: Banco de España, official bulletins, National Commission of Markets and Stocks.

Figure 4.4: Average term to maturity of daily securities issued by regional government (in years)



SOURCE: Banco de España, official bulletins, National Commission of Markets and Stocks.

Table 4.3: Spread determinants: daily 1995-2010

	Dependent variable: Individual spreads					
	TOTAL CCAA			AND	CAT	VAL
Amount/Revenues CCAA$_i$	6.29***	7.15***	6.98***	21.97***	13.36***	13.05***
	(1.07)	(1.10)	(1.09)	(3.84)	(4.11)	(2.49)
Term to maturity	0.03	-0.78***	-0.40*	0.41*	-0.55*	-4.08***
	(0.22)	(0.23)	(0.23)	(0.22)	(0.31)	(1.15)
Sovereing risk premium	0.02	0.02	0.04***	-0.02	0.14***	-0.04**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Spread CCAA$_{j\neq i}$	0.63***	0.57***	0.54***	0.70***	0.72***	0.57***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.06)
Debt/GDP	2.93***	1.35***	1.93***	-2.74***	-0.03	5.95***
	(0.15)	(0.22)	(0.20)	(0.48)	(0.54)	(0.63)
Industrial Production Index	0.20***	-0.06	-0.00	-0.24**	-0.40***	0.45***
	(0.07)	(0.08)	(0.08)	(0.10)	(0.13)	(0.15)
Currency	-21.67***	-	-	-	-	-
	(1.38)	-	-	-	-	-
Rating	-	-0.15	-	-	-	-
	-	(0.22)	-	-	-	-
Budgetary balance/GDP	-	-	5.24***	-6.54***	-3.92*	17.22***
	-	-	(0.63)	(1.08)	(2.08)	(1.84)
Unemployment	-	-	1.57**	3.45***	4.66***	-2.81**
	-	-	(0.62)	(0.64)	(1.00)	(1.22)
GDP growth	-	-	-0.87***	1.98***	-0.52	-6.40***
	-	-	(0.25)	(0.39)	(0.46)	(0.92)
Number of observations	4,787	4,787	4,787	1,364	1,104	2,207
R-square	0.41	0.38	0.38	0.60	0.62	0.37

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.

Table 4.4: Decision Result Summary: 1995-2010

	Timing		Amount		Term to maturity	
	Daily	Quarterly	Daily	Quarterly	Daily	Quarterly
Budgetary balance/GDP	P	-	N	-	N	N
Maturities/Income	P	P	P	P	-	-
Δ Loans/GDP	N	N	-	-	-	-
Number/Amount issued Central Gov.	-	-	-	-	N	N
Number/Amount issued other CCAA	-	P	P	-	P	P
Sovereign risk premium	P	-	N	-		
Spreads $CCAA_{j \neq i}$	N	-	P	-		
Interest Curve					N	N
Debt/GDP	P	P	N	P	N	N
Net Loans/GDP			-	P	N	N
Securities/GDP			N	N	-	-
National GDP growth	P	-	-	-	-	-
IPI growth	N	N				
Δ Unemployment			N	-	N	N

Empty cells mean that these variables are not included in the specific model, while cell with and dash symbol mean that the results are not significant. P represents a positive (increasing) impact on the probability or the amount of issuance, or the term to maturity, whereas N represents a negative (decreasing) impact.

Table 4.5: Probability of issuance: daily 1995-2010

	Dependent variable: Dummy of issuance			
	OLS	Probit	Probit Marg. Ef.	Probit for Heckman
Budgetary balance/GDP	0.002***	0.106***	0.003***	-
	(0.001)	(0.012)	(0.000)	-
Number Maturities/Income	0.030***	0.137***	0.004***	0.203***
	(0.000)	(0.004)	(0.000)	(0.003)
Δ Loans/GDP	0.000	-0.044*	-0.001*	-
	(0.001)	(0.026)	(0.001)	-
Central Gov. number of issues	0.000	0.007	0.000	-
	(0.000)	(0.010)	(0.000)	-
$CCAA_{j \neq i}$ number of issues	0.000*	0.004	0.000	-0.006**
	(0.000)	(0.003)	(0.000)	(0.003)
Sovereign risk premium	0.002*	0.067***	0.002***	0.063***
	(0.001)	(0.018)	(0.001)	(0.015)
Average CCAAs spreads	0.002	-0.100*	-0.003*	-
	(0.003)	(0.057)	(0.002)	-
Debt/GDP	0.003***	0.113***	0.004***	-
	(0.000)	(0.005)	(0.000)	-
National GDP growth	0.000	0.023***	0.001***	-
	(0.000)	(0.007)	(0.000)	-
IPI growth	-0.000***	-0.004***	-0.000***	-0.003**
	(0.000)	(0.001)	(0.000)	(0.001)
Constant	-0.012***	-3.021***	-	-2.299***
	(0.003)	(0.059)	-	(0.030)
Number of observations	92,004	92,004	92,004	92,004
R-squared	0.153	0.279	0.279	0.257

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.

Table 4.6: Amount issued: daily 1995-2010

	Dependent variable: Amount/Income			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.24***	-0.18***	-0.21***	-0.15***
	(0.03)	(0.03)	(0.03)	(0.03)
Number Maturities/Income	0.06***	0.08***	0.07***	0.10***
	(0.02)	(0.02)	(0.02)	(0.02)
Δ Loans/GDP	0.04	0.07	-0.04	-0.03
	(0.06)	(0.06)	(0.06)	(0.06)
Central Gov. (+/-10 days) Import issued/Income	-0.02	-0.01	-0.02	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
$CCAA_{j\neq i}$(+/- 10 days) Import issued/Income	0.18***	0.18***	0.15**	0.14**
	(0.06)	(0.06)	(0.06)	(0.06)
Sovereign risk premium	-0.09***	-0.16***	-0.12***	-0.18***
	(0.03)	(0.05)	(0.03)	(0.05)
Average CCAAs spreads	0.39***	0.36***	0.34**	0.28**
	(0.13)	(0.13)	(0.13)	(0.13)
Debt/GDP	-0.12***	-0.09***	-	-
	(0.01)	(0.01)	-	-
Net Loans/GDP	-	-	-0.02	0.03
	-	-	(0.02)	(0.02)
Securities/GDP	-	-	-0.24***	-0.24***
	-	-	(0.02)	(0.02)
National GDP growth	-0.01	-0.03	-0.01	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Δ Unemployment	-0.04	-0.03	-0.05**	-0.04*
	(0.02)	(0.02)	(0.02)	(0.02)
Constant	1.40***	0.82***	1.61***	1.02***
	(0.13)	(0.23)	(0.14)	(0.23)
Number of observations	2,592	92,004	2,592	92,004
R-squared	0.08	-	0.10	-
λ	-	0.200	-	0.215
ρ	-	0.166	-	0.181

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table 4.5 shows.

Table 4.7: Term to maturity decision: daily 1995-2010

	Dependent variable: Number of years			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.65***	-0.48***	-0.61***	-0.43***
	(0.07)	(0.08)	(0.07)	(0.08)
Number Maturities/Income	-0.05	0.13**	-0.03	0.15***
	(0.05)	(0.06)	(0.05)	(0.06)
Δ Loans/GDP	0.16	0.15	0.05	0.01
	(0.16)	(0.16)	(0.16)	(0.16)
Central Gov. (+/-10 days)	-0.14***	-0.11***	-0.14***	-0.12***
Import issued/Income	(0.03)	(0.03)	(0.03)	(0.03)
$CCAA_{j\neq i}$(+/- 10 days)	0.95***	0.85***	0.90***	0.79***
Import issued/Income	(0.16)	(0.16)	(0.16)	(0.16)
Interest curve	-0.24**	-0.25**	-0.22*	-0.23**
	(0.11)	(0.11)	(0.11)	(0.11)
Debt/GDP	-0.40***	-0.31***	-	-
	(0.03)	(0.04)	-	-
Net Loans/GDP	-	-	-0.27***	-0.15***
	-	-	(0.05)	(0.05)
Securities/GDP	-	-	-0.56***	-0.50***
	-	-	(0.06)	(0.06)
National GDP growth	-0.25***	-0.27***	-0.24***	-0.25***
	(0.05)	(0.05)	(0.05)	(0.05)
Δ Unemployment	-0.09	-0.08	-0.12*	-0.10
	(0.06)	(0.06)	(0.06)	(0.06)
Constant	6.05***	3.26***	6.23***	3.45***
	(0.44)	(0.71)	(0.44)	(0.71)
Number of observations	2,592	92,004	2,592	92,004
R-squared	0.15	-	0.16	-
λ	-	1.006	-	1.022
ρ	-	0.293	-	0.298

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.
The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table 4.5 shows.

Table 4.8: Probability of issuance: Quarterly 1995-2010

	Dependent variable: Dummy of issuance			
	OLS	Probit	Probit Marg. Ef.	Probit for Heckman
Budgetary balance/GDP	-0.00	-0.05	-0.01	-
	(0.01)	(0.05)	(0.02)	-
Number Maturities/Income	0.03***	0.89***	0.27***	0.93***
	(0.00)	(0.08)	(0.01)	(0.08)
Δ Loans/GDP	-0.11***	-0.32**	-0.10**	-
	(0.03)	(0.15)	(0.05)	-
Central Gov. number issued	0.00*	0.02	0.00	-
	(0.00)	(0.01)	(0.00)	-
$CCAA_{j \neq i}$ number issued	-0.02**	0.02	0.01	0.06*
	(0.01)	(0.04)	(0.01)	(0.03)
Sovereign risk premium	0.01	-0.01	-0.00	0.13
	(0.02)	(0.09)	(0.03)	(0.08)
Average CCAAs spreads	0.02	0.29	0.09	-
	(0.06)	(0.28)	(0.08)	-
Debt/GDP	0.06***	0.14***	0.04***	-
	(0.01)	(0.03)	(0.01)	-
National GDP growth	-0.01	-0.05	-0.01	-
	(0.01)	(0.04)	(0.01)	-
IPI growth	-0.00	-0.01	-0.00	-0.01*
	(0.00)	(0.01)	(0.00)	(0.01)
Constant	0.02	-2.30***	-	-1.69***
	(0.07)	(0.31)	-	(0.20)
Number of observations	1,020	1,020	1,020	1,020
R-squared	0.37	0.512	0.512	0.482

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. Estimations include quarter dummies not shown in the table for simplicity reasons.

Table 4.9: Amount issued: quarterly 1995-2010

	Dependent variable: Amount/Income			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.18	-0.02	-0.23	-0.07
	(0.16)	(0.17)	(0.16)	(0.16)
Amount Maturities/Income	0.68***	0.81***	0.79***	0.90***
	(0.07)	(0.08)	(0.07)	(0.08)
Δ Loans/GDP	0.34	0.25	-0.01	-0.08
	(0.46)	(0.44)	(0.44)	(0.43)
Central Gov.	0.03	0.03	0.03	0.02
Import issued/Income	(0.02)	(0.02)	(0.02)	(0.02)
$CCAA_{j \neq i}$	0.12	0.11	0.05	0.05
Import issued/Income	(0.17)	(0.17)	(0.16)	(0.16)
Sovereign risk premium	-0.35	-0.13	-0.41*	-0.19
	(0.23)	(0.30)	(0.22)	(0.28)
Average CCAAs spreads	-0.07	-0.25	-0.21	-0.40
	(0.82)	(0.79)	(0.78)	(0.76)
Debt/GDP	0.08	0.15*	-	-
	(0.07)	(0.08)	-	-
Net Loans/GDP	-	-	0.40***	0.45***
	-	-	(0.09)	(0.09)
Securities/GDP	-	-	-0.36***	-0.30***
	-	-	(0.11)	(0.11)
National GDP growth	-0.07	-0.06	-0.04	-0.03
	(0.12)	(0.11)	(0.11)	(0.11)
Δ Unemployment	-0.12	-0.11	-0.12	-0.09
	(0.23)	(0.22)	(0.22)	(0.21)
Constant	1.37	0.02	1.86**	0.74
	(0.94)	(0.96)	(0.90)	(0.93)
Number of observations	349	1,020	349	1,020
R-squared	0.31	-	0.37	-
λ	-	1.377	-	1.151
ρ	-	0.435	-	0.383

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table 4.8 shows.

Table 4.10: Term to Maturity decision: Quarterly 1995-2010

	Dependent variable: Number of years			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.93***	-0.46***	-0.93***	-0.46***
	(0.22)	(0.17)	(0.22)	(0.17)
Amount Maturities/Income	-0.24**	0.10	-0.22**	0.09
	(0.10)	(0.10)	(0.10)	(0.10)
Δ Loans/GDP	-0.20	-0.52	-0.26	-0.46
	(0.62)	(0.51)	(0.63)	(0.51)
Central Gov.	-0.07**	-0.07***	-0.07**	-0.07**
Import issued/Income	(0.03)	(0.03)	(0.03)	(0.03)
$CCAA_{j \neq i}$	1.12***	1.12***	1.12***	1.13***
Import issued/Income	(0.24)	(0.20)	(0.24)	(0.20)
Interest curve	-0.75*	-0.96***	-0.77*	-0.94***
	(0.40)	(0.33)	(0.40)	(0.34)
Debt/GDP	-0.52***	-0.23***	-	-
	(0.10)	(0.08)	-	-
Net Loans/GDP	-	-	-0.46***	-0.28***
	-	-	(0.13)	(0.10)
Securities/GDP	-	-	-0.60***	-0.16
	-	-	(0.15)	(0.12)
National GDP growth	-0.21	-0.22	-0.21	-0.22
	(0.19)	(0.16)	(0.19)	(0.16)
Δ Unemployment	-0.66**	-0.67***	-0.66**	-0.67***
	(0.31)	(0.25)	(0.31)	(0.25)
Constant	9.15***	4.67***	9.27***	4.54***
	(1.42)	(1.22)	(1.43)	(1.22)
Number of observations	349	1,020	349	1,020
R-square	0.31	-	0.31	-
λ	-	4.328	-	4.361
ρ	-	0.994	-	0.999

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table 4.8 shows.

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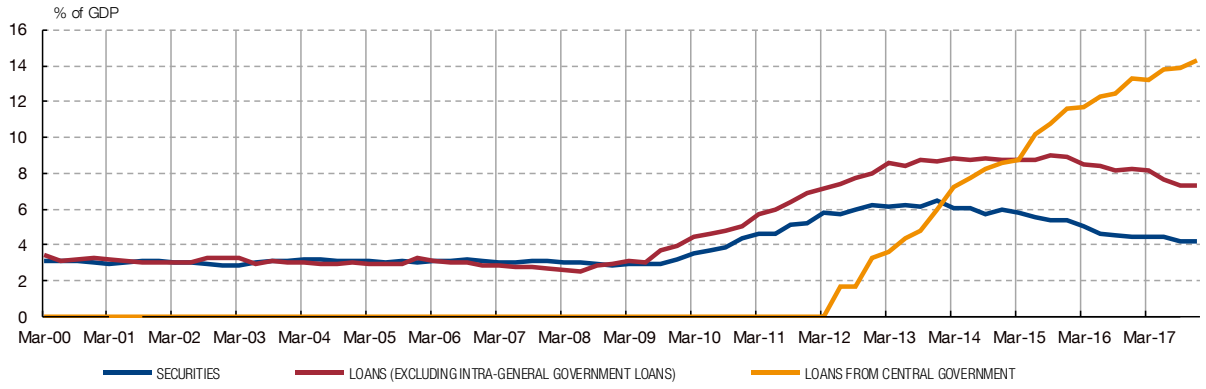
Annex B Regional government access to market funding[31]

B.1 The composition of regional debt

From the onset of EMU, the weight of securities and of loans in overall regional debt held stable – at around 3% of GDP in both cases – until late 2008 (see Figure B.1). Thereafter, both the volume of securities and that of loans (excluding loans to other general government sectors) increased significantly, stabilising as from 2012 and falling in the subsequent years, at which time central government loans began to play a predominant role. Thus, in 2017 regional government debt in the form of securities amounted to 4.2% of GDP, compared with 20.6% in the case of loans, 13.9 pp of which took the form of bilateral loans vis-à-vis central government.

Figure B.1: Total regional government securities and loans as a percentage of GDP



SOURCE:Banco de España

In terms of composition by maturity, in 2017 99.3% of regional government securities were long-term, a figure higher than that of 94.4%, on average, for the pre-crisis period (2000-2007). In the case of loans, long-term instruments are also predominant, albeit with somewhat lower percentages: 97% in 2017 and close to 85% on average for the 2000-2007 period (see Table 1 once more). With regard to the holders of loans, excluding central government, in 2017 somewhat more than 68% were in the hands of residents and the rest with non-residents, a percentage slightly up on the figure of 60% for 2000-2007, and on the figure for the State.

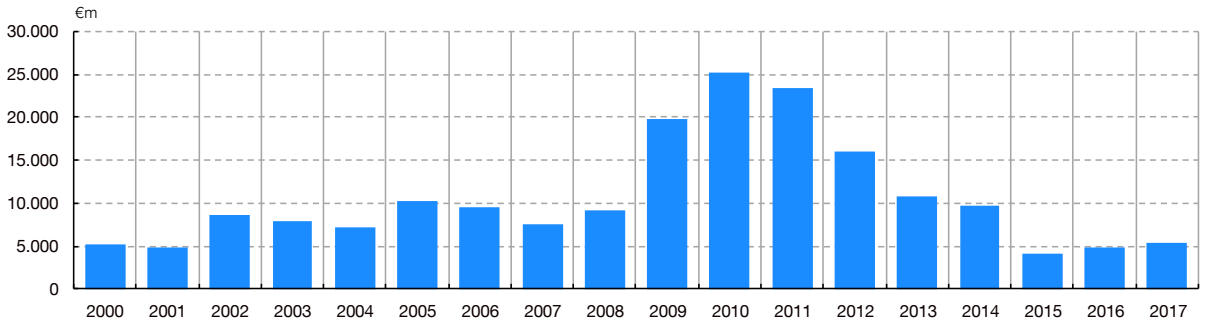
B.2 Regional government access to debt securities markets

Figure B.2 shows the annual volume of debt issues by regional governments as a whole in the period 2000-2017. The increase in the volumes issued in the economic crisis period can be seen in the figure, as can the subsequent reduction as from 2012, a tendency which came to a halt in 2015, when the low for the last two decades was recorded. The volume issued increased slightly in 2016 and 2017, standing at around €5.3 billion in this latter year, up 25% on 2015.

[31] This annex reproduces some sections of Delgado and Pérez (2018).

Nonetheless, this figure is still low in historical terms, given that from 2000 to 2017 somewhat more than €10.5 billion per annum was issued on average, peaking at €25.25 billion in 2010.

Figure B.2: Regional government debt issues: 2000-2017 (a)

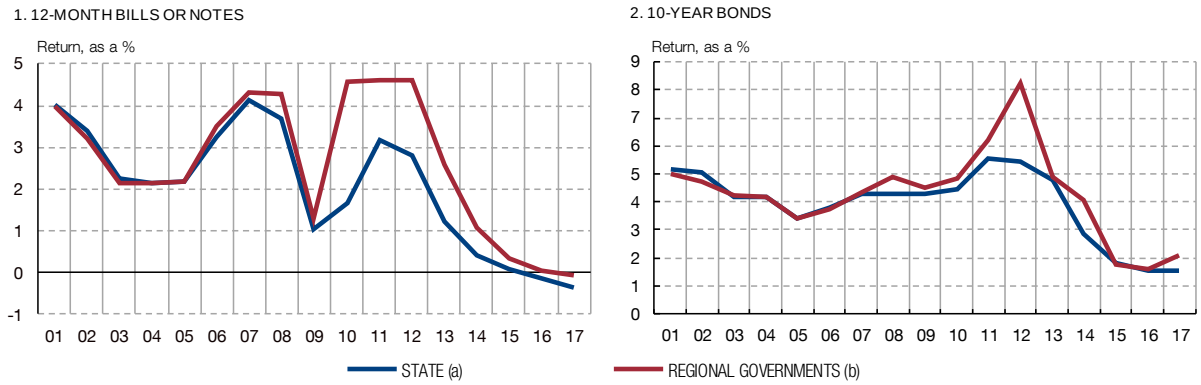


SOURCE:Banco de España
a. Total securities issued in a year, without considering term structure of redemptions of securities issued.

Figure B.3 shows the annual average yield on regional government and Treasury debt issues for two representative instruments: 12-month notes or bills (left-hand panel) and 10-year bonds (right-hand panel). During the pre-crisis period, the issuance costs of regional government debt securities, taken as a whole, were practically identical to those of the State, a situation likewise attained in 2013 for 10-year debt, and somewhat later, around 2015, for 12-month securities. The interim period largely matches the euro area sovereign debt crisis, which affected the regional governments to a greater extent. Thus, the year 2012 saw the biggest spread between 10-year bonds issued by regional governments, taken as a whole, and 10-year Treasury bonds, standing at 280 bp, compared with approximately 15 pp and 40 bp for the averages for 2000-2011 and 2013-2017, respectively. In the case of 12-month bills or notes, the maximum spread between the regional government and Treasury instruments in the period was in 2010, when it stood at 290 bp, compared with the average of 10 bp for the 2000-2009 period, and it held at over 100 bp between 2011 and 2013, on a declining path, narrowing to 26 bp in 2017.

The breakdown of the foregoing figures at the regional level reveals a high degree of heterogeneity, although there are some common patterns. Specifically, there appears to be a positive association between the size of the region and the number of issues, as well as between size and annual amount issued, in euro per inhabitant (see Figure B.4). Likewise, within the group of the biggest regions, Andalusia, Catalonia and the Valencia region tended to record, on average, from 2000 to 2017, a higher percentage of short-term issues than the rest, in relative terms. From a historical standpoint, these three regions have been very active in raising resources on international markets, if the recent years are excepted (see figure B.5). Indeed, from 2012 to 2017 the Catalonian regional government made no long-term issues, or short-term issues from 2013, while the annual average for total issues from 2000 to 2011 was somewhat over 80 per annum. A similar case is the Valencia region, which has not made long-term issues since 2012, or short-term issues since 2014, compared with an annual average of over 175 from 2000 to 2011. In the biggest regions, both Andalusia and the Madrid regional government maintained a continuous presence on markets throughout the 2000-2017 period, although with an issuance

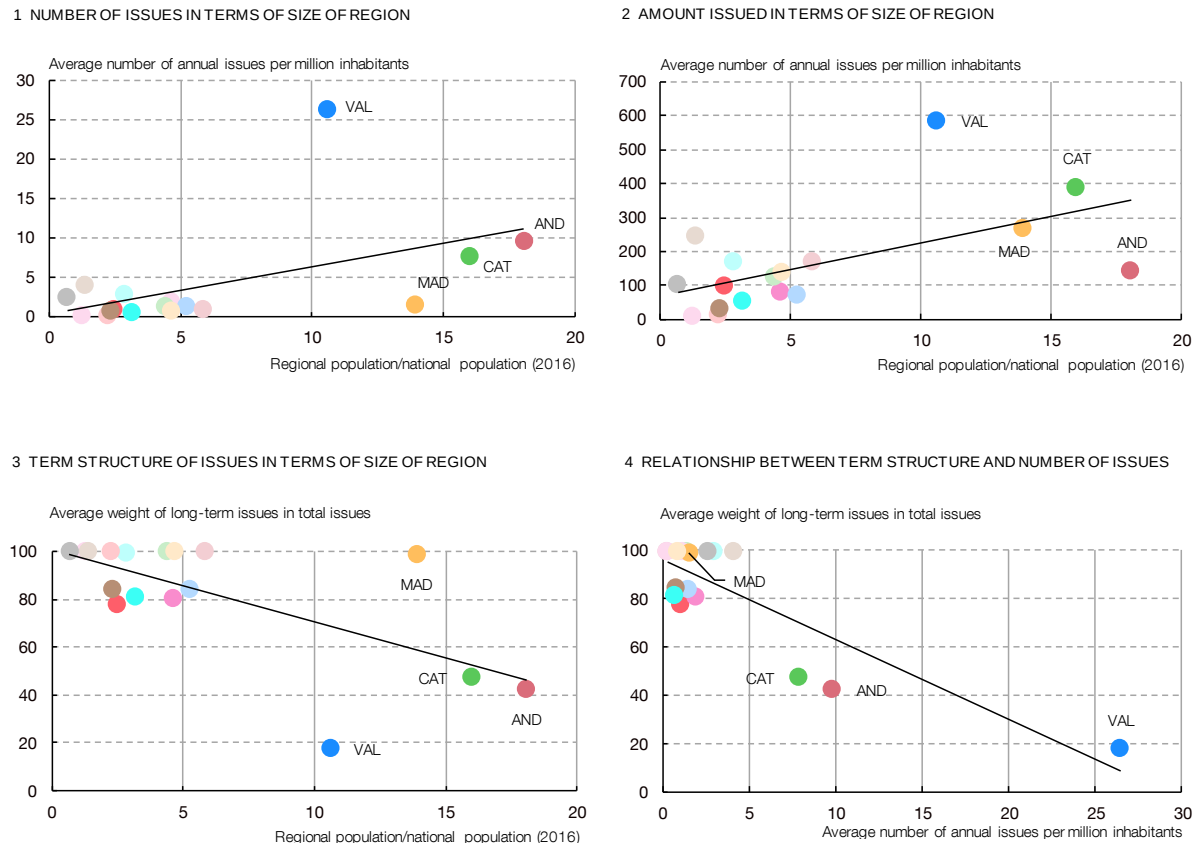
Figure B.3: Annual average return on state and regional government debt issues



SOURCES: Secretaría General del Tesoro y Política Financiera, banco de España, CNMV, Bolsas y Mercados Españoles, official Regional Government gazettes and Instituto Valenciano de Finanzas.
a. Effective marginal rates on new issues.
b. Weighted average of yields on regional government issues (own data). More information in the monthly debt statistics on the website of the Secretaría General del Tesoro: http://www.tesoro.es.

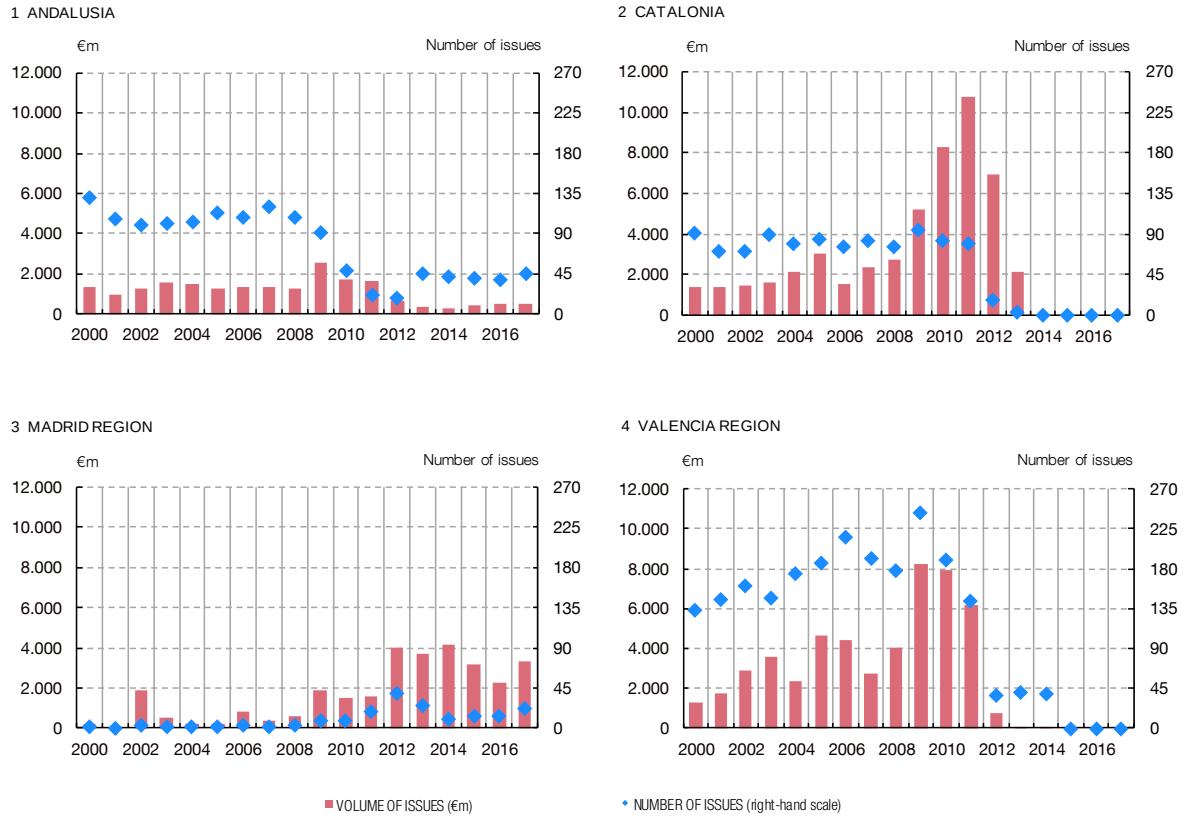
volume in the case of Andalusia that has fallen most significantly since 2012.

Figure B.4: Heterogeneity of regional governments in their patterns of debt issuance on markets (a)



SOURCES: INE and Banco de España.
a. The averages refer to the annual indicators in the 2000-2017 period.

Figure B.5: Debt issues by the most populated regions(a)



SOURCE: Banco de España.
a. The amount of the issues is the sum of the total amount not weighted by the redemption period of the debt security.

Generally, the differing degree of regional government participation in the State's extraordinary financing mechanisms, between 2012 and 2017, has brought about differentiated capital market access dynamics. It should be recalled that, since 2015, the extraordinary funds are structured in the so-called "Regional Government Financing Fund" (RGFF). This fund is divided essentially into two vehicles. The first is the so-called "Regional Government Liquidity Fund" (RGLF), which regional governments not fulfilling budgetary stability, public debt or average supplier payment period objectives must obligatorily join, and which provides continuity to a similar, previous fund of the same name created in 2012. The regional governments included in this fund are subjected by the State to accepting budgetary conditions, with reinforced budgetary control measures, in keeping with the demands of the Law on Budgetary Stability and Financial Sustainability (see Hernández de Cos and Pérez, 2013 for a description of these measures]. The second fund is the "Financial Facility" (FF), intended for those regional governments meeting stability objectives.

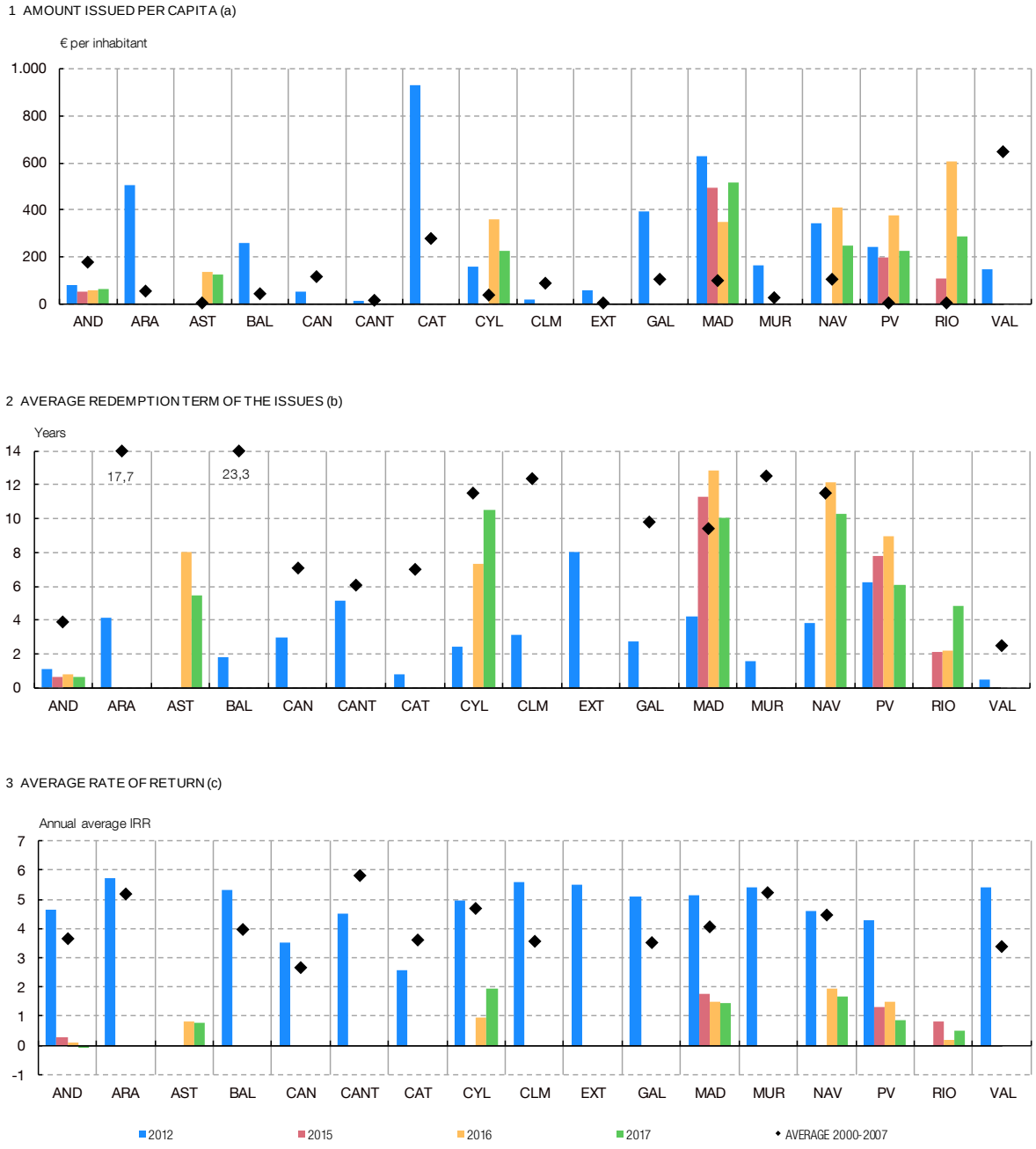
Compliance with the membership conditions for the various funds (the original RGLF, the new RGLF and the FF) have varied over time, as has the willingness of individual regional governments to belong to them, in cases in which they had decision-making power, meaning that regional government membership of the funds has differed in different years. In December

2017 nine regions (Andalusia, Aragón, the Balearic Islands, Cantabria, Castile-La Mancha, Catalonia, Extremadura, the Murcia region and the Valencia region) had acceded to the RGLF, and four to the FF (Asturias, the Canary Islands, Castile-León and Galicia) . The remaining ordinary-regime regions (the Madrid region and La Rioja) did not receive any funding either from the RGLF or the FF in 2017, as did neither the specific-status regions (Navarre and the Basque country).

As can be seen in figure B.6, from 2015 to 2017 those regions not availing themselves of the above funds (Navarre and the Basque country) or which availed themselves only occasionally of them (the Madrid region and La Rioja in 2015, in the case of the FF; Castile-León and Asturias in 2015 and 2017, also the FF) resorted to the markets for funding. The exception was Andalusia, which mainly made short-term issues in these years. The remaining regions did not issue securities from 2015 to 2017, and received funding either from the RGLF or from the FF. Of note has been the behaviour of some regions which have decided to resort to issuing again following years of inactivity, as is the case of Asturias (which had not issued since the 1980s) and the Basque country (since the 1990s). Castile-León, for its part, has significantly increased its issuance volumes, far exceeding past dynamics. All these developments appear to reflect the sound current conditions of financial markets.

Given the exceptional nature of the State funds and the favourable macroeconomic and financial conditions in place, the muted progress observed in the more active role being played by regional governments in tapping the capital markets for funds will foreseeably strengthen in the medium term, in a context marked by the fulfillment of the budgetary stability objectives. In any event, while these mechanisms are operational, the explicit factors of conditionality governing the budgetary conduct of the governments concerned must be strictly applied so as to avoid incentives to pursue inappropriate budgetary policies (see Delgado et al., 2016; Hernández de Cos & Pérez, 2015).

Figure B.6: Regional government debt issues: recent years



SOURCES: Banco de España, CNMV, INE, Bolsas y Mercados Españoles and own data.
a. The amount of the issues is the sum of the total amount not weighted by the redemption period of the debt security.
b. Average weighted by the amounts issued of the average redemption term of the regional government issues.
c. Average weighted by the amounts issued of the rate of return on regional government issues.

Annex C Regional government access to market funding: international experience and recent developments[32]

C.1 Regional and local debt in the international context

Debt issues by local and regional governments have generally grown in significance in international financial markets in recent years. There is little uniformity, however, at the international level, in terms of the weight of sub-central debt in the economy as a whole and as a share of total government debt, as figure C.1 shows. Moreover, there are also differences in the way countries are organised into local and regional governments. The figure shows regional and local debt as a share of GDP (see upper panel) and relative to total government debt (lower panel) in a group of developed countries in 2007 and 2016, using Organisation for Economic Cooperation and Development (OECD) data. In Spain's case, the ratio of subcentral debt to GDP in 2016 was higher than that in some countries organised along federal lines, such as the United States, Switzerland or Germany. After Germany, Spain has the euro area's largest share of this type of debt in its total government debt.

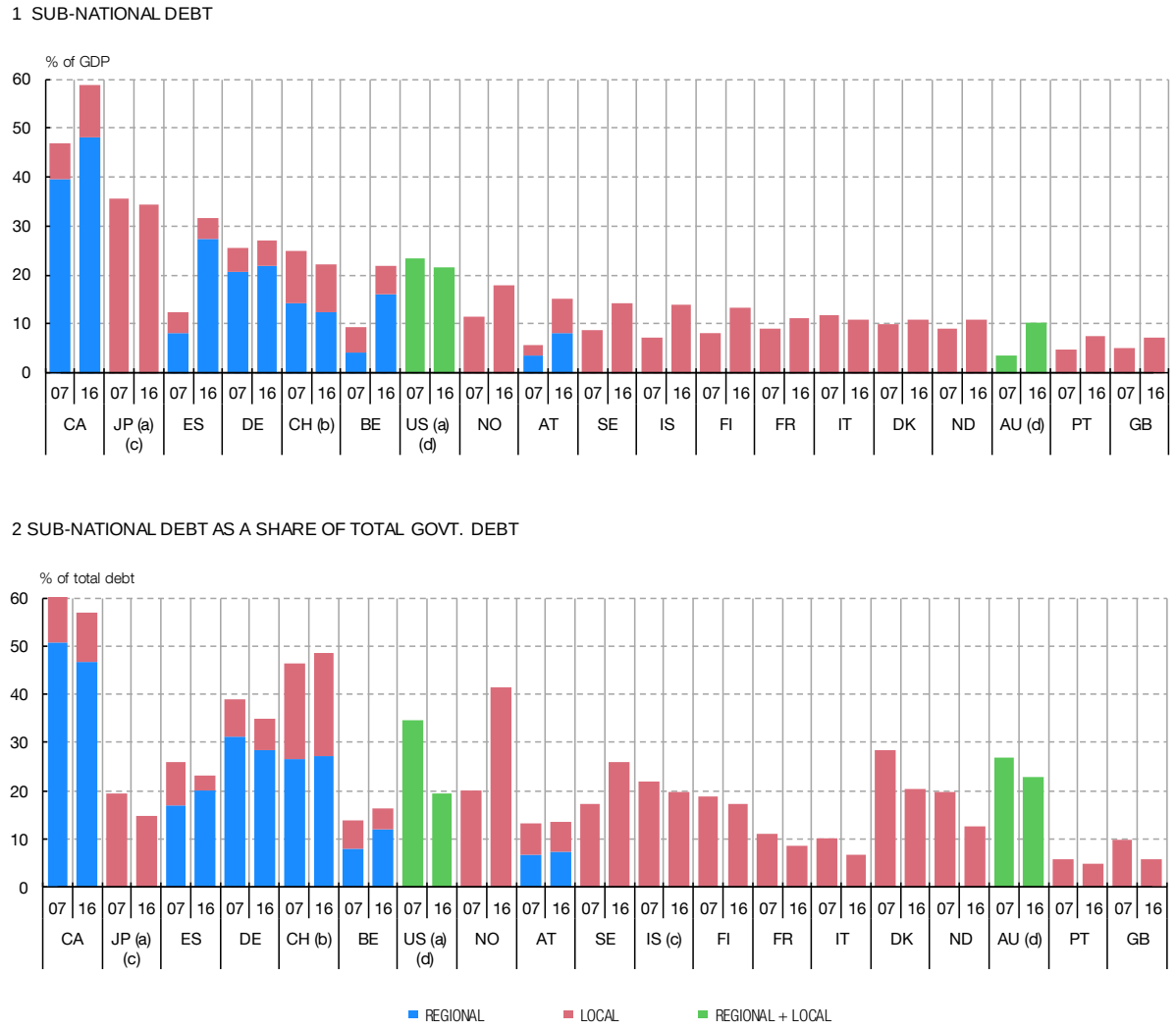
According to the specialised literature, one of the main factors driving this upward trend in sub-central debt in recent decades has been the global process of budgetary decentralisation. This has led many countries, both advanced and emerging, to transfer a growing share of spending and tax raising powers to sub-central government levels, and it has made it possible in practice to take on debt by issuing debt securities on financial markets. In particular, rapid urbanisation in emerging countries has driven large-scale infrastructure projects, which it has been necessary to finance from the markets (Canuto & Liu, 2010a, 2013). Decentralisation processes have also tended to be asymmetric as regards spending and revenue-raising powers, which, in "soft" budgetary constraint scenarios[33] may have encouraged sub-central governments to take on more debt than they would have done if there were more shared fiscal responsibility between government subsectors. In this regard, figure C.2 shows how the degree of decentralisation of public expenditure responsibilities (represented on the horizontal axis) has been higher than that of revenues (regional and local, taken as a whole) for which they have regulatory capacity[34] (on the vertical axis), for OECD member countries as a whole, for which comparable 2011 data are available. This reflects the fact that the points on the figure lie to the right of the main diagonal, even for the main federal countries, such as Canada, Switzerland, the United States and Germany. The figure also shows how that year Spain also had one of the highest levels of decentralisation of the 26 countries considered, viewed from both the sub-central expenditure and revenues viewpoint, ranking sixth in both cases.

[32] This annex is based on some sections of Delgado et al. (2016) with some data updates.

[33] The specialised literature refers to a situation in which a sub-central level of government adopts fiscally irresponsible policies because it builds in expectations of a central government bailout as "soft budgetary constraint". For more details and a discussion of the experience in Spain, see Fernández Llera and García Valiñas (2013).

[34] Revenues over which sub-central governments have regulatory authority as a proportion of total government revenues, against total sub-central government expenditure as a ratio of total government expenditure.

Figure C.1: Sub-national debt by government sectors in percentage of GDP: International Comparison (year 2016)



SOURCE:OECD

a. Total liabilities consolidated only within each sector (Central, including Social Security and central government, Regional and Local), *i.e.* central govt. and the social security fund are consolidated with one another, but regional and local govt. are only consolidated with themselves. United States, Switzerland and Japan, not consolidated due to lack of data.

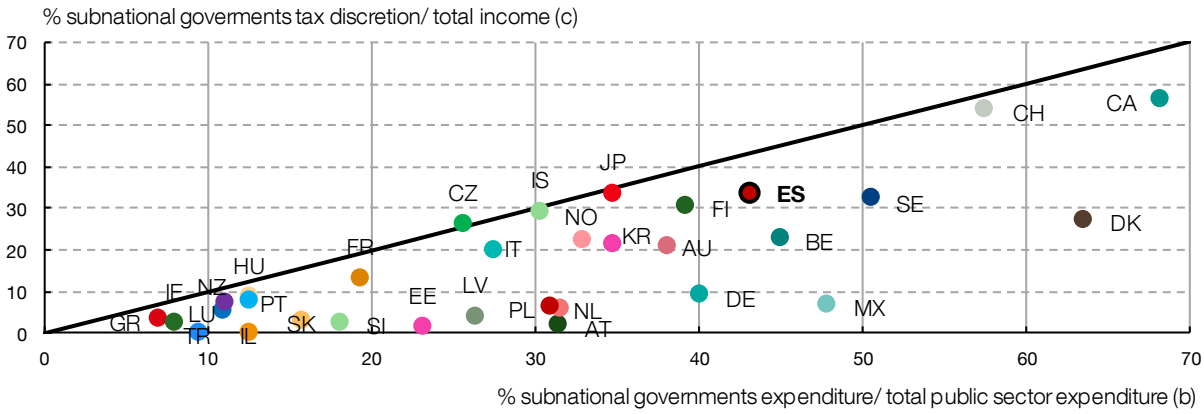
b. 2014 data used for 2016 due to lack of data.

c. 2015 data used for 2016 due to lack of data.

d. Only sum of regional and local data available.

A second driver of increased recourse to debt security issues by sub-central governments has been the way the market for this type of debt has developed (Canuto & Liu, 2010a, 2013). This trend, which has been particularly visible in emerging countries, has enabled a diversification away from traditional funding sources for sub-central debt, such as bank loans. The development of new mechanisms of market access, such as project finance vehicles or special purpose vehicles (SPV) has also contributed. However, in most countries, recourse to bank loans (or central government) remains the dominant alternative. This is illustrated by figure C.3, showing

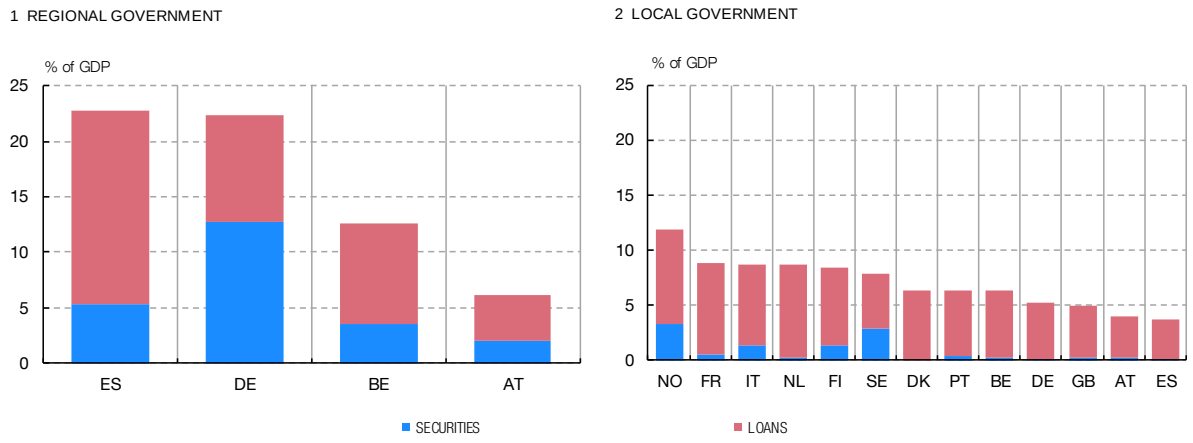
Figure C.2: International Comparison of Autonomy indicators (year 2016) (a)



SOURCE:OECD
a. ISO 3166 standard country coding. For Australia, Israel, Japan, South Korea, Turkey, Mexico, New Zealand, Switzerland and USA data refers to 2015 due to data non-availability.
b. Sum of sub-national government expenditure over total government expenditure.
c. Sub-national revenues over which there is discretionary power.

data on the breakdown of regional and local debt into securities and loans, for a group of European countries for which uniform data are available. In Germany, Spain, Belgium and Austria, regional governments financed themselves through both loans and securities issues, the former being more significant in all cases except Germany, where around 60% of debt was obtained from capital markets. Bank finance predominated in the case of local government. Finland, Norway and Sweden have a higher relative volume of securities than the other countries. This is related to the existence of local funding agencies that are able to aggregate the borrowing requirements of numerous local government bodies to enable larger bond issues. The following section, which describes the commonest means sub-central levels of government use to access market funding in developed economies, looks closer at this issue.

Figure C.3: Structure of debt by subsector in 2014



SOURCE: Eurostat.

C.2 Sub-central governments' mechanisms for accessing markets on the international level

There are a series of common elements that determine market access capacity and conditions for sub-central administrations, such as issuer size and institutional framework. In this respect, one major determinant is whether or not the country has fiscal rules that set targets and limits for debt or other budgetary indicators. The role of central government as a guarantor (or not) for issues is another important factor, and in particular, whether there is a "no bailout" clause. Clauses of this kind aim to avoid the cost of one government subsector's fiscal irresponsibility being passed on to the rest and are essential to ensure that the capital market keeps discipline by differentiating between government subsectors in terms of their risk premiums. Finally, having a credit rating is usually a requirement for market access. This imposes information requirements to promote standardisation and to meet the market's demands for more information transparency.

The way in which these elements are effectively combined determines the make-up of the issue mechanisms, which also differ in terms of the debt issuer's level of individual responsibility. First of all, it is possible to distinguish those cases in which regions or other sub-central bodies are able to issue individually and so are subject to a higher level of market discipline. Secondly, there are others that make joint issues, either at the same level of government or otherwise, such that a large part of the risk is pooled. Lastly, there are those cases in which central government assumes all the risk of the issue, for example when it taps the market for funds that, in turn, it channels towards sub-central governments, or when it guarantees issues by the latter.

The first group, in which sub-national governments issue debt directly, includes the cases of the United States, Canada, Belgium, Switzerland and Germany in particular. The United States presents one of the largest and most active sub-national debt markets, where the municipal bond market includes bonds issued by the states, municipalities and other government entities, such as publicly owned ports and airports. There is a wide variety of securities, in terms of types and yields,[35] and bankruptcy is only possible in the case of local governments.[36] Canada's provinces also have a long tradition of issuing debt on markets. In 2014, 25% of total private and public long-term bonds were issued by the provinces, slightly more than the federal government, which accounted for 23%.[37] As in the case of the United States, debt issues by Canadian provinces are not backed by the federal government (Joffe, 2012). In Belgium, where there are several interconnected levels of government, all regions and communities are authorised to issue debt and habitually tap the markets, although they require central government authorisation.

[35]Other common types of bonds include general obligation bonds (GOs, for short), where both the principal and interest are guaranteed by the issuer's credit and tax-raising capacity, and revenue bonds, which are paid with income generated by a specific project, such as tolls.

[36]The Municipal Insolvency Act (Chapter 9 of the Bankruptcy Code) was passed by Congress in 1937 in response to the numerous municipal bankruptcies during the Great Depression. Although bankruptcies of local authorities have been relatively rare, the case of the city of Detroit in July 2013 stands out. See Canuto and Liu (2013) and Cuadro-Sáez (2013) for examples of local- and state-government crisis resolution in the United States.

[37]Report by the Ontario Securities Commission: "The Canadian Fixed Income Market 2014".

In Switzerland, each sub-national government is responsible for its own debt. In the case of Germany, the federal states (Länder) usually issue bonds on the capital markets individually.

As regards the second group or type of issues described above, joint issues have also been common in Germany, involving either groups of Länder (to issue bonds known as Jumbos)[38] or the Länder and the federal government (through Bund-Länder-Bonds).[39] Joint issues also include those involving local financing agencies, which are specialist credit institutions for local bodies, part-owned by municipalities, and sometimes by central government. There is a long history of this type of agency in the Netherlands, Norway, Sweden, Finland and Denmark, where they date back furthest (created in 1898), and they usually have a high credit rating. Along similar lines, France and the United Kingdom have recently set up local financing agencies.[40] In France, Dexia's bankruptcy meant the loss of the largest lender to local authorities, making creating a local agency a way of keeping local authorities' access to finance open. Outside Europe there are institutions of this kind in Canada, Japan and the United States.

Lastly, in some countries central government taps the markets to subsequently provide funds to sub-central governments, typically as bilateral loans. One example is that of Austria's Länder, which are authorised to access the market directly, but can also ask the "Federal Financing Agency" to tap the markets for them and subsequently make loans to each individual Land. This category could include those countries that have public financial institutions equivalent to a development bank to finance sub-national government projects, such as the KFW group in Germany[41] or Kommunalkredit in Austria (99.8% owned by the federal government).

[38] To date, 49 joint issues have been carried out, with varying numbers of states involved in each. The participants are usually between five and seven of the smaller Länder (in terms of size or population) although there have been issues in which a larger number of Länder have taken part, such as that in 1997, which had ten participants. The volume of Jumbo issues has usually been significantly higher than that of issues by individual Länder.

[39] These bonds first came on the market in June 2013. This was a joint issue by ten states (with a share of 86.5% of the total issued) and the federal government. This issue obtained the maximum rating from Fitch (AAA), *i.e.* the same rating as the federal government (UNICREDIT, 2013).

[40] The Agence France Locale was created in late 2013 and is 100% owned by a total of 91 local authorities. In the United Kingdom, the Municipal Bonds Agency was proposed as an independent agency in 2014. Outside Europe, for example in New Zealand, the New Zealand Government Funding Agency was set up in 2011.

[41] Created after the Second World War to channel Marshall Plan funds. Ownership is currently divided between the federal government (80%) and the Länder (20%). It finances specific housing, education and environment programmes. Its issues are fully guaranteed by the federal government.

Annex D Additional tables

Table D.1: Spread determinants: daily 1995-2017

	Dependent variable: Individual spreads					
	TOTAL CCAA			AND	CAT	VAL
Amount/Revenues CCAA$_i$	2.20***	2.35***	2.19**	18.61***	12.66***	13.76***
	(0.85)	(0.86)	(0.86)	(4.78)	(4.38)	(2.46)
Term to maturity	-0.01	-0.41**	-0.37**	0.22	-0.49	-4.25***
	(0.18)	(0.18)	(0.18)	(0.27)	(0.33)	(1.15)
Sovereign risk premium	0.07***	0.07***	0.09***	0.19***	0.14***	-0.02
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Spread CCAA$_{j\neq i}$	0.63***	0.62***	0.60***	0.69***	0.63***	0.58***
	(0.02)	(0.02)	(0.03)	(0.04)	(0.04)	(0.05)
Central Gob. Funds/GDP	-1.10***	-0.84**	-1.16***	-1.13*	14.04	-6.05***
	(0.28)	(0.35)	(0.35)	(0.65)	(28.61)	(0.99)
Debt/GDP	2.28***	1.63***	1.86***	0.31	-1.05**	5.01***
	(0.14)	(0.18)	(0.16)	(0.48)	(0.53)	(0.41)
Industrial Production Index	0.07	-0.06	-0.06	-0.43***	-0.41***	0.32**
	(0.07)	(0.07)	(0.08)	(0.11)	(0.13)	(0.15)
Currency	-16.42***	-	-	-	-	-
	(1.28)	-	-	-	-	-
Rating	-	-0.73***	-	-	-	-
	-	(0.16)	-	-	-	-
Budgetary balance/GDP	-	-	4.69***	1.19	-2.50	12.52***
	-	-	(0.61)	(1.24)	(2.17)	(1.48)
Unemployment	-	-	0.60	2.58***	4.99***	-4.61***
	-	-	(0.61)	(0.76)	(1.04)	(1.15)
GDP growth	-	-	-1.12***	-1.00***	1.20***	-4.92***
	-	-	(0.18)	(0.35)	(0.38)	(0.56)
Number of observations	5,511	5,511	5,507	1,559	1,173	2,441
R-square	0.57	0.56	0.56	0.71	0.66	0.52

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.

Table D.2: Decision Result Summary 1995-2017

	Timing		Amount		Term to maturity	
	Daily	Quarterly	Daily	Quarterly	Daily	Quarterly
Budgetary balance/GDP	P	N	N	-	-	-
Maturities/Income	P	P	P	P	P	-
Δ Loans/GDP	N	N	N	N	N	-
Number/Amount issued Central Gov.	-	P	P	P	-	-
Number/Amount issued other CCAA	P	P	P	-	P	P
Sovereign risk premium	P	-	N	N		
Spreads $CCAA_{j \neq i}$	P	P	-	-		
Interest Curve					-	N
Debt/GDP	-	N	N	N	N	N
Central Gob. Funds/GDP	N	N	N	N	N	N
Net Loans/GDP			P	P	N	-
Securities/GDP			N	N	P	-
National GDP growth	N	N	-	-	N	-
IPI growth	N	N				
Δ Unemployment			-	-	-	N

Empty cells mean that these variables are not included in the specific model, while cell with and dash symbol mean that the results are not significant. P represents a positive (increasing) impact on the probability or the amount of issuance, or the term to maturity, whereas N represents a negative (decreasing) impact.

Table D.3: Probability of issuance: daily 1995-2017

	Dependent variable: Dummy of issuance				
	Probit	Probit Marg. Ef.	Probit	Probit Marg. Ef.	Probit for Heckman
Budgetary balance/GDP	0.052***	0.002***	0.044***	0.001***	-
	(0.009)	(0.000)	(0.008)	(0.000)	-
Number Maturities/Income	0.213***	0.007***	0.208***	0.007***	0.208***
	(0.003)	(0.000)	(0.003)	(0.000)	(0.003)
Δ Loans/GDP	-0.039***	-0.001***	-0.005	-0.000	-
	(0.015)	(0.001)	(0.015)	(0.001)	-
Debt/GDP	0.001	0.000	-	-	-
	(0.002)	(0.000)	-	-	-
Central Gob. Funds over GDP	-	-	-0.024***	-0.001***	-0.026***
	-	-	(0.003)	(0.000)	(0.003)
Central Gov. number of issues	-0.002	-0.000	0.000	0.000	-
	(0.009)	(0.000)	(0.009)	(0.000)	-
$CCAA_{j \neq i}$ number of issues	0.014***	0.000***	0.007***	0.000***	0.005**
	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Sovereing risk premium	0.067***	0.002***	0.064***	0.002***	0.048***
	(0.013)	(0.000)	(0.013)	(0.000)	(0.007)
Average CCAAs spreads	0.062*	0.002*	0.053	0.002	-
	(0.035)	(0.001)	(0.035)	(0.001)	-
National GDP growth	-0.002	-0.000	-0.004	-0.000	-
	(0.005)	(0.000)	(0.005)	(0.000)	-
IPI growth	-0.003**	-0.000**	-0.002*	-0.000*	-0.003**
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Constant	-2.493***	-	-2.400***	-	-2.392***
	(0.039)	-	(0.034)	-	(0.023)
Number of observations	135,082	135,082	135,082	135,082	135,082
R-squared	0.236	0.236	0.238	0.238	0.237

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.

Table D.4: Amount issued: daily 1995-2017

	Dependent variable: Amount/Income			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.13***	-0.09***	-0.15***	-0.05**
	(0.02)	(0.02)	(0.02)	(0.02)
Maturities/Income	0.03**	0.17***	0.07***	0.18***
in the following month	(0.01)	(0.02)	(0.02)	(0.02)
Δ Loans/GDP	-0.11**	-0.12***	-0.17***	-0.16***
	(0.04)	(0.04)	(0.04)	(0.04)
Central Gov. (+/-10 days)	0.01	0.02**	0.01	0.02**
Import issued/Income	(0.01)	(0.01)	(0.01)	(0.01)
$CCAA_{j \neq i}$(+/- 10 days)	0.18***	0.17***	0.17***	0.16***
	(0.05)	(0.05)	(0.05)	(0.05)
Sovereign risk premium	-0.02	-0.08**	-0.03	-0.09**
	(0.03)	(0.04)	(0.03)	(0.04)
Average CCAAs spreads	0.15	0.10	0.16*	0.05
	(0.10)	(0.10)	(0.09)	(0.10)
Debt/GDP	-0.04***	-0.02***	-	-
	(0.01)	(0.01)	-	-
Central Gob. Funds/GDP	-	-	-0.04***	-0.08***
	-	-	(0.01)	(0.01)
Net Loans/GDP	-	-	0.01	0.07***
	-	-	(0.01)	(0.01)
Securities/GDP	-	-	-0.15***	-0.09***
	-	-	(0.02)	(0.02)
National GDP growth	-0.02	-0.03*	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Δ Unemployment	-0.02	0.01	-0.02	0.00
	(0.02)	(0.02)	(0.02)	(0.02)
Constant	0.73***	-0.80***	1.00***	-0.93***
	(0.10)	(0.15)	(0.11)	(0.18)
Number of observations	3,297	135,080	3,297	135,080
R-squared	0.04	-	0.05	-
λ	-	0.663	-	0.718
ρ	-	0.459	-	0.493

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table D.3 shows.

Table D.5: Term to maturity decision: daily 1995-2017

	Dependent variable: Number of years			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.31***	-0.10	-0.36***	0.03
	(0.07)	(0.07)	(0.07)	(0.07)
Maturities/Income	-0.34***	0.22***	-0.26***	0.21***
in the following month	(0.04)	(0.05)	(0.05)	(0.05)
Δ Loans/GDP	-0.16	-0.27**	-0.28**	-0.29**
	(0.13)	(0.12)	(0.13)	(0.13)
Import issued/Income	0.02	0.04	0.01	0.05
Central Gov. (+/-10 days)	(0.03)	(0.03)	(0.03)	(0.03)
Import issued/Income	0.42***	0.28**	0.39***	0.27*
$CCAA_{j \neq i}$(+/- 10 days)	(0.14)	(0.14)	(0.14)	(0.14)
Interest curve	-0.15	-0.10	-0.12	-0.12
	(0.11)	(0.10)	(0.11)	(0.10)
Debt/GDP	-0.14***	-0.09***	-	-
	(0.02)	(0.02)	-	-
Number Maturities/Income	-	-	-0.09**	-0.26***
in the next month	-	-	(0.04)	(0.04)
Net Loans/GDP	-	-	-0.09**	0.08**
	-	-	(0.04)	(0.04)
Securities/GDP	-	-	-0.32***	-0.12**
	-	-	(0.05)	(0.05)
National GDP growth	-0.29***	-0.27***	-0.27***	-0.25***
	(0.05)	(0.05)	(0.05)	(0.05)
Δ Unemployment	-0.19***	-0.09	-0.18***	-0.12*
	(0.07)	(0.06)	(0.07)	(0.06)
Constant	4.51***	-1.40***	4.98***	-2.38***
	(0.38)	(0.51)	(0.39)	(0.58)
Number of observations	3,297	135,080	3,297	135,080
R-squared	0.08	-	0.09	-
λ	-	2.456	-	2.705
ρ	-	0.552	-	0.595

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table D.3 shows.

Table D.6: Probability of issuance: Quarterly 1995-2017

	Dependent variable: Dummy of issuance				
	Probit	Probit Marg. Ef.	Probit	Probit Marg. Ef.	Probit for Heckman
Budgetary balance/GDP	-0.10***	-0.04***	-0.09**	-0.04**	-
	(0.04)	(0.02)	(0.04)	(0.01)	-
Number Maturities/Income	0.56***	0.22***	0.61***	0.24***	0.61***
	(0.04)	(0.01)	(0.04)	(0.02)	(0.04)
Δ Loans/GDP	-0.42***	-0.17***	-0.35***	-0.14***	-
	(0.08)	(0.03)	(0.08)	(0.03)	-
Central Gov. number issued	0.02*	0.01*	0.02*	0.01*	-
	(0.01)	(0.00)	(0.01)	(0.00)	-
$CCAA_{j\neq i}$ number issued	0.03	0.01	0.02	0.01	0.06***
	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Sovereign risk premium	0.06	0.03	0.06	0.02	0.17***
	(0.06)	(0.02)	(0.06)	(0.02)	(0.04)
Average CCAAs spreads	0.28*	0.11*	0.20	0.08	-
	(0.16)	(0.07)	(0.17)	(0.07)	-
Debt/GDP	-0.03***	-0.01***	-	-	-
	(0.01)	(0.00)	-	-	-
Central Gob. Funds	-	-	-0.10***	-0.04***	-0.11***
over GDP	-	-	(0.02)	(0.01)	(0.02)
National GDP growth	-0.07**	-0.03**	-0.06*	-0.02*	-
	(0.03)	(0.01)	(0.03)	(0.01)	-
IPI growth	0.00	0.00	-0.00	-0.00	-0.01
	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)
Constant	-1.47***	-	-1.59***	-	-1.56***
	(0.20)	-	(0.20)	-	(0.12)
Number of observations	1,496	1,496	1,496	1,496	1,496
R-squared	0.373	0.373	0.393	0.393	0.377

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. Estimations include quarter dummies not shown in the table for simplicity reasons.

Table D.7: Amount issued: Quarterly 1995-2017

	Dependent variable: Amount/Income			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.15	-0.06	-0.05	0.04
	(0.13)	(0.14)	(0.13)	(0.14)
Amount Maturities/Income	0.65***	0.74***	0.63***	0.70***
	(0.05)	(0.06)	(0.06)	(0.06)
Δ Loans/GDP	-0.82***	-0.80***	-0.74***	-0.70***
	(0.25)	(0.25)	(0.26)	(0.25)
Central Gov.	0.05***	0.05**	0.06***	0.05**
Import issued/Income	(0.02)	(0.02)	(0.02)	(0.02)
$CCAA_{j \neq i}$	0.08	0.12	0.05	0.10
Import issued/Income	(0.12)	(0.12)	(0.12)	(0.12)
Sovereign risk premium	-0.49**	-0.37*	-0.50***	-0.41*
	(0.19)	(0.22)	(0.19)	(0.22)
Average CCAAs spreads	0.29	0.20	-0.00	-0.06
	(0.55)	(0.57)	(0.54)	(0.56)
Debt/GDP	-0.06*	-0.06*	-	-
	(0.03)	(0.03)	-	-
Central Gob. Funds over GDP	-	-	-0.27***	-0.27***
	-	-	(0.06)	(0.06)
Net Loans/GDP	-	-	0.15***	0.15**
	-	-	(0.06)	(0.06)
Securities/GDP	-	-	-0.13*	-0.11
	-	-	(0.08)	(0.08)
National GDP growth	-0.13	-0.14	-0.10	-0.11
	(0.10)	(0.10)	(0.10)	(0.10)
Δ Unemployment	-0.02	-0.00	-0.04	-0.01
	(0.17)	(0.17)	(0.17)	(0.17)
Constant	2.28***	1.69**	1.93**	1.31*
	(0.75)	(0.77)	(0.76)	(0.79)
Number of observations	533	1,496	533	1,496
R-squared	0.28	-	0.30	-
λ	-	0.841	-	0.824
ρ	-	0.254	-	0.254

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively. The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table D.6 shows.

Table D.8: Term to Maturity decision: Quarterly 1995-2017

	Dependent variable: Number of years			
	OLS	Heckman	OLS	Heckman
Budgetary balance/GDP	-0.42**	-0.12	-0.33*	0.07
	(0.18)	(0.15)	(0.18)	(0.15)
Amount Maturities/Income	-0.36***	0.11	-0.41***	-0.01
	(0.07)	(0.08)	(0.08)	(0.09)
Δ Loans/GDP	-0.36	-0.26	-0.25	0.06
	(0.36)	(0.32)	(0.36)	(0.34)
Central Gov. Import issued/Income	0.04	-0.01	0.04	-0.01
	(0.03)	(0.02)	(0.03)	(0.03)
$CCAA_{j \neq i}$ Import issued/Income	0.20	0.45***	0.20	0.48***
	(0.17)	(0.15)	(0.17)	(0.15)
Interest curve	-0.54*	-0.60**	-0.64*	-0.70**
	(0.33)	(0.29)	(0.33)	(0.30)
Debt/GDP	-0.14***	-0.12***	-	-
	(0.05)	(0.04)	-	-
Central Gob. Funds over GDP	-	-	-0.32***	-0.35***
	-	-	(0.08)	(0.08)
Net Loans/GDP	-	-	0.00	-0.02
	-	-	(0.08)	(0.07)
Securities/GDP	-	-	-0.11	0.15*
	-	-	(0.11)	(0.08)
National GDP growth	-0.07	-0.22	-0.05	-0.20
	(0.18)	(0.15)	(0.18)	(0.15)
Δ Unemployment	-0.63***	-0.54***	-0.66***	-0.57***
	(0.24)	(0.20)	(0.24)	(0.20)
Constant	6.81***	3.69***	6.41***	2.46**
	(1.28)	(1.14)	(1.30)	(1.19)
Number of observations	533	1,496	533	1,496
R-square	0.14	-	0.15	-
λ	-	5.043	-	5.304
ρ	-	0.982	-	1

Significance at the 1%, 5% and 10% levels are represented by ***, **, * respectively.
The first step of the Heckman model (Probit Model) is not included in this table for simplicity. It includes the same variables as the last column of table D.6 shows.

Table D.9: Summary statistics: data 1995-2017

		Quantity issued data: daily 1995-2017				Spreads data	
		Days issued	Amount/ Income	Amount/Income with zeros	Average Maturity	Number Securities	Spreads
TOTAL CCAA	mean	3,410	0.63	0.01	2.0	5,738	0.35
	Std. Dev.	-	1.39	0.23	4.2	-	0.51
AND	mean	629	0.25	0.02	1.3	1,587	0.27
	Std. Dev.	-	0.32	0.11	3.3	-	0.43
ARA	mean	59	1.95	0.01	7.5	19	0.67
	Std. Dev.	-	2.59	0.27	7.5	-	0.52
AST	mean	5	1.46	0.00	5.6	4	0.53
	Std. Dev.	-	0.84	0.04	2.6	-	0.29
BAL	mean	17	4.70	0.01	4.3	2	0.81
	Std. Dev.	-	5.68	0.33	4.0	-	1.01
CAN	mean	62	1.00	0.01	3.6	56	0.12
	Std. Dev.	-	1.19	0.13	5.7	-	0.19
CANT	mean	3	2.92	0.00	8.3	-	-
	Std. Dev.	-	3.39	0.08	5.8	-	-
CyL	mean	60	1.37	0.01	7.3	36	0.67
	Std. Dev.	-	1.66	0.18	3.8	-	0.62
CM	mean	41	1.53	0.01	7.0	30	0.12
	Std. Dev.	-	1.37	0.14	6.5	-	0.28
CAT	mean	556	0.52	0.03	1.6	1,225	0.29
	Std. Dev.	-	1.20	0.34	3.5	-	0.38
VAL	mean	1,606	0.36	0.07	0.5	2,588	0.40
	Std. Dev.	-	0.72	0.34	1.5	-	0.56
EXT	mean	13	1.07	0.00	8.2	7	1.27
	Std. Dev.	-	1.64	0.08	4.9	-	0.57
GAL	mean	60	2.03	0.01	5.9	24	1.15
	Std. Dev.	-	1.74	0.23	4.9	-	0.69
MAD	mean	183	1.20	0.03	8.1	100	0.85
	Std. Dev.	-	2.60	0.42	7.6	-	0.75
MUR	mean	18	3.69	0.01	7.1	8	0.78
	Std. Dev.	-	3.66	0.24	5.4	-	0.77
NAV	mean	41	3.06	0.01	7.2	22	0.57
	Std. Dev.	-	2.39	0.27	3.9	-	0.45
PV	mean	42	2.34	0.01	7.0	14	0.47
	Std. Dev.	-	1.46	0.19	3.5	-	0.49
RIO	mean	15	3.54	0.01	3.7	16	0.57
	Std. Dev.	-	2.16	0.17	1.5	-	0.37

Table D.10: Summary statistics: quarterly database 1995-2017

		Quantity issued data: Quarterly 1995-2017				
		Quarters issued	Amount/ Income	Amount/Income with zeros	Average Maturity	Dummy Issuance
TOTAL	Mean	552	3.88	1.4	5.0	0.35
CCAA	Std. Dev.	-	3.81	2.9	4.9	-
AND	Mean	92	1.74	1.7	1.7	1.00
	Std. Dev.	-	1.20	1.2	1.0	-
ARA	Mean	25	4.60	1.3	9.4	0.27
	Std. Dev.	-	4.06	2.9	7.0	-
AST	Mean	3	2.43	0.1	5.2	0.03
	Std. Dev.	-	1.37	0.5	2.3	-
BAL	Mean	11	7.27	0.9	6.8	0.12
	Std. Dev.	-	6.20	3.1	6.6	-
CAN	Mean	34	1.82	0.7	4.3	0.37
	Std. Dev.	-	1.69	1.3	4.2	-
CANT	Mean	3	2.92	0.1	8.3	0.03
	Std. Dev.	-	3.39	0.7	5.8	-
CyL	Mean	34	2.41	0.9	8.3	0.37
	Std. Dev.	-	1.94	1.7	3.6	-
CM	Mean	19	3.30	0.7	8.9	0.21
	Std. Dev.	-	1.66	1.5	6.7	-
CAT	Mean	75	3.88	3.2	2.0	0.82
	Std. Dev.	-	3.38	3.4	1.3	-
VAL	Mean	80	7.15	6.2	0.8	0.87
	Std. Dev.	-	5.17	5.4	0.4	-
EXT	Mean	8	1.74	0.2	8.8	0.09
	Std. Dev.	-	2.07	0.8	3.9	-
GAL	Mean	37	3.30	1.3	7.5	0.40
	Std. Dev.	-	2.28	2.2	5.3	-
MAD	Mean	46	4.78	2.4	8.8	0.50
	Std. Dev.	-	5.08	4.3	6.0	-
MUR	Mean	14	4.74	0.7	7.7	0.15
	Std. Dev.	-	4.00	2.3	4.8	-
NAV	Mean	33	3.80	1.4	8.6	0.36
	Std. Dev.	-	2.53	2.4	3.1	-
PV	Mean	29	3.39	1.1	8.0	0.32
	Std. Dev.	-	2.22	2.0	2.8	-
RIO	Mean	9	5.90	0.6	3.9	0.10
	Std. Dev.	-	3.73	2.1	1.2	-

Table D.11: Summary statistics: Explanatory variables 1995-2017

	Daily data		Quarterly data	
	Mean	Std. Dev.	Mean	Std. Dev.
Number of issues Central Gov.	0.14	0.34	12.42	4.11
Amount issued Central Gov.	2.82	2.32	22.75	10.43
Risk premium	1.16	1.36	1.16	1.35
Interest curve	2.01	1.21	2.01	1.20
Number of issues $CCAA_{j \neq i}$	0.38	0.63	5.65	2.58
Amount issued $CCAA_{j \neq i}$	4.58	4.82	2.13	1.26
$Spread_{j \neq i}$	0.42	0.40	0.45	0.40
Debt/GDP	9.53	7.90	9.53	7.90
Δ Loans/GDP	0.19	0.65	0.19	0.65
Central Gob. Funds/GDP	1.68	4.84	1.71	4.89
Loans/GDP	4.92	3.43	4.92	3.43
Securities/GDP	2.90	2.64	2.90	2.64
CCAA Revenues	6,607	6,572	6,606	6,574
Deficit/GDP	-1.06	1.41	-1.06	1.41
IPI growth	0.56	8.18	0.40	6.40
Regional GDP growth	4.64	3.97	4.64	3.98
National GDP growth	2.21	2.44	2.22	2.45
Δ EPA	0.00	1.44	-0.01	1.14
Term to Maturity ordered dummy	1.37	0.64	2.02	0.70

Concluding remarks

This section summarizes and discusses the general contributions of this Ph.D. dissertation.

This thesis analyses the fiscal sustainability of the CCAAs following an alternative approach to the traditional study of the design of the financing system. It tries to enlighten the problem of regional indebtedness and offers some policy advices to prevent regional fiscal misbehaving. Over the last four decades, CCAAs have progressively gained responsibilities, both from a tax and an expenditure point of view, transforming Spain into one of the most decentralised countries in the world.

The economic crisis has raised some important questions in relation with who is responsible for the subnational debt. Subnational governments from several countries suffered some fiscal stress during the economic crisis, as soaring deficits where difficult to fund. Several central governments helped subnational governments to cope with the liquidity shortage through transfers or financial facilities. Spain created two different facilities in the core of the debt crisis, the suppliers payment fund (FFPP) and the Autonomous liquidity facility (FLA). Both funds implied a transformation of CCAAs loans and securities into loans with the Central government, converting the central government into the main creditor of CCAAs. Thus, the bailout of the CCAAs increased the central government vulnerability towards CCAAs behaviour.

This thesis analyses four specific subjects that have affected CCAAs public accounts, putting in danger the fiscal stability of the CCAAs: the debt-GDP ratio evolution, the fiscal non-compliance, the commercial debt and the debt market behaviour of CCAAs. The main results point out the necessity to discuss the current design of the financing system of the CCAAs as a global matter, *i.e.* the discussion must go beyond the share of revenues and expenditures that the CCAAs are assigned. The debt sustainability and the clarification of who is responsible for this debt are key matters in the fiscal decentralisation design. Should the central government prevent possible CCAAs' bankruptcies? Should Spain have a permanent facility to cope with CCAAs liquidity crisis? What should be the consequences of resorting to this facility?

Chapters 1 and 2 conclude that debt and deficits are more subdued when CCAAs have higher fiscal autonomy, and vertical fiscal imbalances are lower. Thus, increasing fiscal co-responsibility could enhance fiscal target compliance and reduce its pressure over the debt. A striking result in both chapters is that fiscal rules do not seem to affect neither the debt evolution nor the deficit target compliance. The strength of fiscal rules has risen since 2012, with a higher

accounts transparency and data availability. Nevertheless, the 2012 budgetary stability law enforcement is still weak, with a lack of sanctions applied in the case of non-compliance. A further reinforcement of fiscal rules is advisable to ensure its effectiveness in preventing new episodes of elevated levels of fiscal non-compliance.

Another factor that may have played a relevant role in fiscal responsibility is market discipline. Nonetheless, due to the effect of the economic crisis and the gradual transformation of some CCAAs debt into loans with the central government, market discipline has probably been harmed. In chapter 4, the CCAAs issuance behaviour is described and analysed. Some CCAAs have stopped issuing debt in the markets in the last years, and the full return to the markets is still at stake. Moreover, the role of the Financing Fund for the CCAAs is still unclear in a situation of normal access to the market. As the non-bailout clause has been violated during the crisis, the financing system should be redesigned in order to prevent the moral hazard problem generated by this sort of funds. The future of the Financing Fund for the CCAAs is a conundrum (the FFCCAA has substituted the FLA and the FFPP). Its role in future crises should be strictly defined, establishing the circumstances and procedure to access the financing from this Fund and the control of the conditions CCAAs must fulfil. Another possibility could be the elimination of this fund and the return to only market funding.

Finally, another key factor in debt accumulation has been the large amounts of commercial debt during the crisis and the excessive lengthening of the arrears. These excessive delays in paying suppliers may have a negative impact on Spanish economic activity. The control of commercial debt is now one of the main points of action in the Budgetary Stability Law, but there are still CCAAs not complying with the maximum legal delay.

In conclusion, CCAAs debt has become a worrying matter during the economic crisis due to its rapid increase. Some related matters have been object of an increasing public attention such as the commercial debt and the issuance in markets. The recovery of a normal issuance and commercial debt situation and the gradual fiscal consolidation should improve the fiscal sustainability for the CCAAs. In times of economic prosperity, CCAAs should try to reduce their stock of debt to increase their room for manoeuvre to face future crisis. The fiscal design, the strength of fiscal rules, the market discipline and the political responsibility could help to ensure a healthier fiscal situation for the CCAAs, with less debt and deficit and better access to the markets at a lower cost.

Abstract

Essays on the subnational government's indebtedness

Introduction

This Ph.D. dissertation offers an extensive analysis of the Spanish regional governments' (Autonomous Communities, CCAAs) indebtedness from complementary perspectives: debt evolution, deficit target non-compliance, commercial debt and securities issuance.

They make for an interesting case to study for a number of reasons. First, Spain has a high level of fiscal decentralisation and CCAAs are responsible for some of the largest and social-targeted spending items: health and education. Their proper functioning, stability and fiscal sustainability are essential for the well-being of the Spanish society. Second, they have gained significant political and fiscal autonomy over the past four decades. This process of decentralisation has been asymmetric, with a different decentralisation speed for revenue and expenditure depending on the region, leading to both temporal and cross-sectional variations in fiscal and political autonomy indicators. Third, they account for around a third of the General Government debt increase from 2007 to 2017. Fourth, they accumulated a significant amount of commercial debt during the core of the crisis. Finally, CCAAs, as a group, have been fairly active in debt markets during the last two decades.

CCAAs' debt became more relevant in the outburst of the European debt crisis, as the debt sustainability of some European countries was at stake. Spain was one of these countries that suffered a sudden increase in both public deficits and debt levels in all tiers of government. As a consequence, sovereign risk premium surged. Subnational debt added to the sustainability problem, as CCAAs struggled to face new funding needs generated by the accumulation of significant deficits. Soaring CCAAs' deficits and debt were accompanied by two additional concerns: first, the enlargement of commercial debt and the delay in payment of suppliers; second, the difficulties some CCAAs found to issue new debt in the markets at a reasonable cost. The central government created two facilities to cope with these two specific problems, transforming the central government in the main creditor of the CCAAs, and increasing its vulnerability to fiscal developments of the CCAAs.

Objectives and Results

This Ph.D. dissertation aims at studying the fiscal soundness of the CCAAs by analysing four specific matters in four chapters: debt evolution, deficit target compliance, commercial debt and securities issuances. These chapters are closely related as all matters are intertwined.

The first two chapters analyse the evolution of debt ratio over GDP and the budgetary target compliance through the estimation of a Generalised method of moments model (GMM). Both variables are related because deficits are one of the main drivers of debt increases, while higher debt would enlarge deficits through the interest payments. In both cases, fiscal autonomy and market discipline have played a central role in reducing incentives for regional governments to misbehave in term of public accounts, whereas fiscal rules have not been very effective in encouraging further fiscal consolidation when needed. This is probably due to the lack of sanctions and to the moral hazard effect caused by the factual bail-out produced by the creation of some financial facilities. CCAAs government may believe now that the central government would always prevent any possible bankruptcy.

Debt developments have also been affected by its structure. CCAAs with higher weight of securities over loans have increased less their debt amount, probably due to the stronger discipline private investors exert on their investments, raising rapidly the cost of refinancing. Commercial debt has also been an essential factor in debt increases, as parts of the accumulated commercial debt was directly transformed into standard debt from 2012 onwards.

In relation specifically to budgetary target compliance, CCAAs' governments involvement in target determination appears to be crucial for compliance. Governments would only feel bound by targets they consider as their own. Increasing the collaboration in the target setting between the different levels of governments would probably guarantee a higher level of compliance. Moreover, the feasibility of the targets is fundamental as CCAAs will not feel obligated towards targets that are not achievable. In the process of targets setting, the economic situation of each region should be considered, as they are not homogeneous.

The third chapter focuses on the evolution of commercial debt and the macroeconomic impact of the Supplier Payment Financing Fund (FFPP), which was a facility created in 2012 by the Central government to repay subnational commercial debt. This fund existed from 2012 to 2014 paying a total amount of 6.3% of GDP to regional and local governments supplier. The impact is evaluated by two different models, an Autoregressive Vector Model (VAR) and the Quarterly Macroeconometric Model of the Banco de España. Both models conclude that during the three years the programme was in force, the cumulated impact on GDP was around 0.3pp. This programme took place in a period of economic downfall, financial stress and low banking liquidity. Thus, it probably had a significant impact on investment and employment growth. Simultaneously to this positive effects, CCAAs commercial debt was transformed into standard debt, entailing a sudden expansion of debt levels. Thus, controlling for commercial debt developments has become an essential concern of CCAAs fiscal sustainability.

Finally, the last chapter develops an innovative study of CCAAs' securities issuances that encloses two different questions: what are the determinants of the CCAAs securities spreads, and what drives the CCAAs decision to issue debt. The first question is analysed by an OLS model and considers securities characteristics, economic variables and the sovereign risk premium. Spreads depend basically on the amount issued, the term to maturity, the sovereign risk, the spreads of securities of other CCAAs and the stock of debt. All these factors, with the exception of the term to maturity, tend to push upwards the spreads.

The second question is divided into three aspects: the timing, the amount issued and the term to maturity. The timing decision is analysed through a Probit model, whereas the amount and the term to maturity are estimated by a Heckman sample selection correction model. The main forces driving the issuance decision are the funding necessities, the behaviour of other issuers in the Spanish public debt market (other CCAAs and the central government) and the stock of debt.

Conclusions

In conclusion, the recent economic crisis has triggered the debate of who is the ultimate responsible for the public debt. Both the CCAA and the central government must ensure that debt is sustainable: The CCAA as direct responsible for paying the debt and the central government because, in the end, regional debt may affect its cost of financing and it may even have to face the payment in the case of a possible bankruptcy. Better institutions, stronger control of deficits and debts and an increase of co-responsibility are advisable to ameliorate fiscal sustainability. Moreover, authorities from all levels must be responsible for their behaviour and face consequences for the mismanagement of public resources. Finally, Spanish authorities should reach an agreement about the procedure to follow in case of future fiscal crises. A clear crisis solution mechanism would help to deal with future liquidity and sustainability challenges.

Resumen

La problemática del endeudamiento de las administraciones públicas territoriales

Introducción

Esta tesis ofrece un extenso análisis de la problemática del endeudamiento de las Comunidades Autónomas Españolas (CCAA), desde distintos puntos de vista: la deuda, el incumplimiento de los objetivos de déficit, la deuda comercial y de las emisiones de deuda.

Las CCAA constituyen un interesante caso de estudio por varias razones. España es un país con un elevado nivel de descentralización, siendo las CCAA responsables de dos de los gastos más cuantiosos de carácter social, la educación y la sanidad. Por lo tanto, la estabilidad de las CCAA es clave para el bienestar de la sociedad española. Por otro lado, las CCAA han adquirido un creciente nivel de autonomía tanto política como fiscal en las últimas cuatro décadas, a través de un largo proceso de descentralización. Este proceso ha sido asimétrico, con una velocidad diferente de descentralización de los ingresos y los gastos, y por regiones, de forma que el proceso se ha caracterizado por una elevada heterogeneidad en los niveles de autonomía fiscal y política. Asimismo, el aumento de la deuda de las CCAA ha sido muy significativo en la última década. De hecho, un tercio del total del aumento de la deuda soberana de España se ha debido a la acumulación de deuda de las CCAA. Por último, el elevado nivel de deuda comercial durante la crisis y las recurrentes emisiones de deuda durante todo el periodo hacen de las CCAA un caso de estudio de especial interés.

Las CCAA tomaron relevancia durante la crisis de la deuda europea, periodo en el que la estabilidad financiera y fiscal de algunos países se puso en duda. España no fue una excepción. Los niveles de deuda y déficit de todos los subsectores de las Administraciones Públicas experimentaron un fuerte incremento. En consecuencia, el riesgo soberano aumento drásticamente. La deuda subnacional agravó el problema, puesto que las CCAA tuvieron que enfrentarse a fuertes dificultades a la hora de encontrar financiación a un coste razonable para sus crecientes déficits. A los elevados niveles de deuda y déficits se le añadieron dos problemas. Por un lado, la deuda comercial aumentó y los retrasos en el pago de los proveedores se dilataron. Por otro, las CCAA se enfrentaron a la falta de liquidez en los mercados y en el sistema bancario. El gobierno central

estableció dos facilidades para ayudar a las CCAA a solucionar estos dos problemas, y como consecuencia, parte de los valores y préstamos de las CCAA se transformaron en préstamos con la Administración Central y, por lo tanto, aumentó su vulnerabilidad a la situación de las CCAA.

Objectivos and Resultados

Esta tesis estudia la solvencia de las CCAA a través del análisis de cuatro cuestiones específicas desarrolladas en cuatros capítulos: la deuda, el cumplimiento de los objetivos de déficit, la evolución de la deuda comercial y de los valores emitidos en mercados. Los cuatro capítulos están fuertemente relacionados debido a que las cuestiones son complementarias.

Los dos primeros capítulos analizan la evolución de la ratio de deuda sobre el PIB y del cumplimiento de los objetivos de déficit. Para ello se estima modelos de método de momentos generalizados (GMM). Ambas variables están relacionadas ya que los déficits son la principal fuente de acumulación de deuda, mientras que un nivel mayor de deuda aumentaría los déficits a través de mayores pagos de intereses. En ambos casos, la autonomía fiscal y la disciplina de mercado han jugado un papel fundamental en desincentivar comportamientos nocivos para la estabilidad de las cuentas públicas. Mientras que las reglas fiscales no parecen haber tenido el impacto esperado sobre la necesaria consolidación fiscal. Probablemente esta falta de efectividad se deba a la inexistencia de sanciones y al problema de azar moral generado por el rescate producido con la creación de las facilidades financieras. Las CCAA pueden considerar ahora que el gobierno central hará lo posible para evitar una posible quiebra de cualquier de ellas.

La evolución de la deuda también ha dependido de su estructura. Así, CCAA con deudas formadas por una mayor cuantía en valores con respecto a los préstamos han acumulado menos deuda debido posiblemente a la mayor disciplina exigida por los inversores con respecto a los bancos. Por último, la deuda comercial también ha sido una fuente principal de acumulación de deuda, ya que una proporción elevada de la misma acabó convirtiéndose en deuda estandar a partir del año 2012.

En relación al cumplimiento de los objetivos de déficit, la implicación de los gobiernos regionales en la determinación de los objetivos es básica para asegurar el cumplimiento, puesto que éstos los considerar como propios. Además, los objetivos deberán ser alcanzables, ya que unos objetivos excesivamente exigentes desvincularán a los gobiernos de sus obligaciones de cumplimiento. Si un objetivo no es alcanzable, es como si no existiera. Por lo tanto, en el proceso de determinación de los objetivos, la situación específica de cada CCAA debería ser tenida en cuenta, dando lugar a objetivos individualizados.

El tercer capítulo se centra en la evolución de la deuda comercial y el impacto macroeconómico del Fondo de Financiación del Pago a Proveedores (FFPP), facilidad financiera creada en 2012 por el gobierno central para pagar la deuda comercial pendiente. Este fondo existió entre 2012 y 2014 y pagó un total de 6,3% del PIB a los proveedores de los gobiernos regionales

y locales. Se estiman dos modelos para evaluar el impacto de estos pagos, un modelo de vector autoregresivo (VAR) y el modelos macroeconometrico trimestral del Banco de España. Ambos modelos concluyen que durante los tres años que el programa estuvo en vigor, el impacto acumulado sobre el PIB a lo largo de esos tres años fue de entorno 0,3pp. Este programa se implementó durante un momento de fuerte desaceleración económica, con tensiones financieras y reducida liquidez bancaria, por lo que el impacto fue muy significativo tanto sobre la inversión como sobre el empleo. Por otro lado, este programa supuso la transformación de la deuda comercial en deuda estándar, implicando la necesidad de controlar este tipo de deuda en episodios futuros.

Finalmente, el último capítulo contiene un estudio innovador sobre las emisiones de deuda de las CCAA que engloba dos cuestiones diferenciadas: Los determinantes de los spreads de estos valores, y las decisiones de emitir de las CCAA. La primera cuestión se analiza con un modelo de regresión de mínimos cuadrados y considera la cantidad emitida, el plazo de vencimiento, el riesgo soberano, los *spreads* de los valores emitidos por otras CCAA, y el *stock* de deuda acumulado. Todos estos factores, con la excepción del plazo de vencimiento han presionado al alza a los spreads en estas últimas dos décadas.

La segunda cuestión se divide en decisiones específicas: el momento de emitir, la cuantía emitida y el plazo de vencimiento. Para el análisis sobre el momento de emitir se estima un modelo Probit, mientras que para las decisiones de cuantía y plazo se desarrolla un modelo de corrección de la selección muestral de Heckman. Las CCAA han emitido más y a más largo plazo en momentos de mayor cuantía de vencimientos, cuando otras CCAA han accedido a los mercados y cuanto menor es su stock de deuda de partida.

Conclusiones

La reciente crisis económica ha despertado el debate sobre quién es el responsable final del pago de la deuda pública. Ambos, las CCAA y el gobierno central, han de asegurar que la deuda sea sostenible: las CCAA como responsable directo y el gobierno central para prevenir que al final se convierta en su responsabilidad a través de un rescate. Mejores instituciones, controles más estrictos sobre el déficit y la deuda , y el incremento de la corresponsabilidad fiscal son deseables para incentivar una mejor gestión de los recursos públicos. Las autoridades de todos los niveles de gobierno han de ser responsables de sus actos y de su mala gestión. Finalmente, sería recomendable un acuerdo global sobre cuál debería ser el procedimiento a seguir en futuras crisis.